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MONTHLY REVIEW

OF THE

U. S. BUREAU OF LABOR STATISTICS

VOLUME IV—FEBRUARY, 1917—NUMBER 2



WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

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INDUSTRIAL POISONS USED IN THE MAKING OF EXPLOSIVES.

BY ALICE HAMILTON, A. M., M. D.

INTRODUCTION.

[This article is a preliminary report of an investigation of 40 munition plants, the full description of which, together with a consideration of methods of prevention and treatment of the poisoning incident to work in these factories, will appear later.]

The manufacture of explosives has increased rapidly and enormously since the outbreak of the European war, and, although the great rush of contracts for the European market has been diminishing during the last few months, there is still a great deal of high explosive manufactured and millions of shells are still being filled with explosive charges. Moreover, it would be a mistake to suppose that these plants will close down after the war is over. Many men in the industry believe that the compounds now being manufactured for military purposes can be used for peace explosives or as a basis for the manufacture of dyes and other chemicals for which we formerly depended entirely on Europe.

This is a new and unfamiliar industry in the United States. We have manufactured nitroglycerine and mercury fulminate for many years to a very small extent, and such explosives as guncotton, smokeless powder, and picric acid, but carbolic acid and benzene and toluene and anilin, so necessary in the making of explosives, used to come from Germany, and the new materials for detonators and shells, TNT, tetryl, TNA, etc., have been made here to a very limited extent. This means that only in a few long-established factories were the problems connected with such work well understood, and there were only a few company physicians who knew anything about the poisons involved in the industry.

Most of the plants which were built after the war began were experimental in every sense of the word, and although those built by

the older companies are for the most part well constructed and managed; this is not without exception.

Haste has been the chief evil in this industry since the outbreak of the war. Contracts were accepted with a time limit, construction started at once, and then because of the shortage of labor and slowness in the delivery of machinery work was delayed. Then the owners, fearful of forfeiting their contract, began getting out the product before the works were anywhere near ready. Naturally everything that was needed for rapid production was pushed; everything that was needed for the protection of the workmen was postponed. One such plant, said to represent an investment of several million dollars, operated for 17 months without any provision of washing facilities for the men, who even in the heat of July and August had to leave the plant covered with the poisonous dust in which they had been working. At the noon hour they collected in the shade of a railway bridge and ate their lunch with unwashed hands. Exhaust systems for carrying off fumes and dust were also postponed because they could wait, while the machinery for production could not. There is no way of knowing how much illness and death resulted from the mad rush, during the first year of the war, to get out explosives in a shorter time than they could properly be made.

Another thing that led to sickness in these plants was the newness of the work, the engineering problems of which had to be solved by men with little or no experience in this field. Chemists and engineers and superintendents took the risks of their experiments and suffered more than their proportion of occupational poisoning. It was in many instances only after some severe or even fatal case of poisoning had occurred that they woke to a realization of the danger of the compounds they were working with.

Naturally the danger from explosion was the first to attract attention, and in the effort to avoid destructive and deadly accidents they did not notice the slow and subtle danger of poison.

Still another result of the newness of the industry can be seen in the large number of cases of poisoning which occurred through some accident to the machinery, sometimes necessitating repairs in stills or retorts which had been filled with poisonous fluids, sometimes resulting in "boil-overs" or leaks, with the escape of deadly fumes. Such accidents tend to be much rarer now; they were frequent while the industry was still in its experimental stage.

If chemists and engineers were faced with a new problem this was even more true of the physicians living in the neighborhood of these new plants. Such occurrences as cyanosis and syncope from nitrobenzene fumes, of toxic hepatitis from trinitrotoluene, of fatal edema of the lungs from nitrous fumes, were a totally new experience to the ordinary physician, nor was he able to find much in American

medical literature to help him out. If his practice was near the factory he was at least able to connect the illness with the occupation, but if, as often happened, the workmen were drawn from a number of near-by towns, the physicians in these places had no reason to suspect that the illness complained of by the patient was of occupational origin.

For all these reasons it seems timely to set forth in detail the dangers attendant on the manufacture of explosives, to describe the different poisonous compounds which are involved in the work, and to tell what is known of their effects on the human system.

DESCRIPTION OF THE INDUSTRY.

This investigation was made during nine months of 1916, from the middle of April to the middle of December, so that the influence of all sorts of weather on conditions was seen. The factories are situated in Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and Indiana. Forty in all were visited, employing a total force of about 90,000 men, but the number of those whose work exposes them to poisons is only about 30,000.¹ This is, however, the force engaged at any one time in the industry. A very much larger number were working at different times during the year covered by the inquiry, for there is an enormous labor turnover in the majority of these plants. In some, a man who has been there from the beginning is pointed out as a curiosity, and yet the beginning may have been only eight months back. Naturally, it is in just the departments we are considering—those where fumes are irritating and men fall sick—that the shifting is greatest.

There are very few women employed in these departments; indeed, with the exception of 40 or 50, who handle TNT and TNA, the only poison to which women workers are exposed is mercury fulminate, which does not cause anything more serious than an eczema-like eruption. The absence of boys also is noteworthy in this industry.

The making of black powder, ordinary gunpowder, is not attended with any danger of occupational poisoning, and therefore it is not included in this study. The explosives which were studied are the following:

- Nitrocellulose (pyroxylin and military guncotton).
- Smokeless powder, including mixed nitroglycerin powders.
- Picric acid and ammonium picrate.
- Nitroglycerin and dynamite.
- Fulminate of mercury.

¹ We have taken no account of accidents or of burns from explosions or acids, only of occupational diseases resulting from contact with the chemicals made or handled in this industry.

Trinitrotoluene, or TNT or triton.¹

Nitronaphthalenes.

Tetranitranilin, or TNA.

Tetranitromethylanilin, or tetryl.

Poisonous substances which are used in the production of these explosives comprise the following:

Nitric acid.

Sulphuric acid.

Benzine (or benzol) and toluene.

Nitrobenzene.

Anilin.

Chlorbenzene and nitrochlorbenzene.

Phenol, or carbohic acid.

Sulphuric ether.

Mercury and mercuric nitrate.

Methyl alcohol.

Amyl acetate.

Finally, in the course of manufacturing explosives certain poisons are evolved as a result of chemical reactions, being really by-products or intermediate stages in production. These are:

Oxides of nitrogen, in all processes of nitration.

Sulphur dioxide, in the making of phenol.

Chlorine gas, in the making of nitric acid.

Ethyl nitrite, in the making of fulminate.

These compounds vary greatly in their effects, but among them are some very dangerous poisons.

It is not possible to discover how much occupational disease has been caused by work in this industry since the war broke out. The information simply is not obtainable. Some plants, not many, furnish no medical service to their men, who must go to outside doctors, and if the physician is not familiar with the work in that plant he does not think of classing the illness as occupational. The majority of firms making explosives employ a physician to take care of their men, but if he makes only occasional visits to the plant, or if he impresses the men—only too inclined to be suspicious—as more bent on shielding the company than on caring for them, they will go off to other doctors. Such physicians usually can not or will not give any information to an investigator.

On the other hand, even when the medical care given is excellent, the doctor perhaps keeps no records and can not make a detailed statement; he can only speak in general terms. Out of the 40 plants there were 12 where no usable information could be secured, 9 where it was quite inadequate, and 19 which were under the charge of careful and outspoken doctors who probably saw almost all the cases of illness in the force and who gave us their records.

One instance will illustrate the striking difference between employers in this respect and will also serve to show how incomplete is the list of cases of occupational poisoning we have been able to secure. Two factories fill shells with triton, TNT. One had a physician in

¹ "Trinitrotoluene" is the term used by American chemists, but manufacturers of explosives are accustomed to use "trinitrotoluol."

charge who gave us his full record of cases of poisoning, mild and serious, from this compound, a little less than 300, including 2 fatalities, which would be a mortality rate of one in 150. The second factory had had a physician recently appointed, who either did not know or would not tell anything about poisoning in the plant, but from other physicians we secured records of five fatal cases. If the same rate of mortality obtained in this factory as in the first, we ought to add 750 cases to our list, but, adhering to our rule that we would include none without medical authority for it, we have been able to charge only five to this second factory.

Naturally this brings about a thoroughly anomalous situation, for to judge by our records the best managed factories have a large number of cases of illness, the worst managed have few or none.

The following is the list of industrial poisonings which we were able to discover as having occurred in 28 plants in the space of about a year:

CASES OF INDUSTRIAL POISONING IN 28 PLANTS IN ONE YEAR.

Poison.	Number of cases.			Fatal cases.		
	Men.	Women.	Total.	Men.	Women.	Total.
Nitrogen oxides and nitric acid.....	1,389		1,389	28		28
Trinitrotoluene.....	658	43	701	10	2	12
Picric acid.....	7		7			
Nitrobenzene and nitrotoluene.....	12		12	1		1
Benzene and toluene.....	12		12	5		5
Sulphuric ether.....	52		52	1		1
Anilin.....	205		205			
Phenol.....	2		2	1		1
Sulphuric acid.....	4		4	1		1
Mixed acids.....	2		2	1		1
Chlorine gas.....	3		3			
Ammonia gas.....	1		1			
Mercury.....	1		1			
Fulminate of mercury.....	79	32	111			
Nitronaphthalene.....	2		2			
Total.....	2,429	75	2,504	48	2	50

Though all of these were serious enough to come under the observation of a physician, they vary in severity from a case of rapidly fatal congestion of the lungs from nitrous fumes to a case of eczema from filling caps with fulminate. There were nine other fatal cases, all men, six from triton and three from nitrous fumes, which were reported to us either by men who were not physicians or at second hand by physicians who had only heard of the occurrences and had not themselves seen the men. It has seemed best not to include these in our enumeration, although some of them had every mark of authenticity.

NITROGEN OXIDES.

The reason why nitrogen oxide fumes head the list is that all of these explosives are produced through a process of nitration, and in the course of it there is always more or less evolution of nitrous

fumes, as they are usually called. The thousand-odd men who suffered from nitrous fumes had been employed in making nitrocellulose, picric acid, the nitrotoluenes, nitrobenzenes, nitronaphthalenes, nitroglycerin, and the nitric acid needed for these processes.

In the making of explosives a mixed acid is used for nitration, one ingredient of which is sulphuric acid and the other nitric acid 100 per cent strong. When we remember that the "strong" or "fuming" nitric acid of the chemical laboratory is only about 70 per cent pure, we can readily see how great is the danger from fumes in connection with this work. When the mixed acid is exposed to the air or when it is being added to the substances to be nitrated, decomposition sets up at once with the evolution of the lower oxides of nitrogen, which rapidly take up oxygen from the air and change it to the higher oxides. The lower oxides are pale or colorless; the higher are of a deep orange color. It is almost always easy to discover the site of a nitric-acid or a nitrating plant by following the yellow color which tints the sky over it and which often is deep and dense enough to be seen for several miles. Sometimes decomposition takes place suddenly and violently enough to reduce the nitric acid to a finely atomized spray, and this is caught and mingled with the oxide fumes.

These gases, known usually as nitrous fumes, are very irritating to one who is unaccustomed to them, but the workmen soon establish a good deal of tolerance, and the visitor to the factory may be choked and tearful and speechless in an atmosphere which seems to be causing no discomfort to the men who work there. If something goes wrong and there is an unusual production of fumes, the air does become unbearable even to the men, and unless they run to the fresh air they may become badly poisoned. Unfortunately the immediate effect of breathing these fumes is often not painful enough to give the men sufficient warning of their danger. Many men have stayed in the poisoned atmosphere long enough to cause damage to the throat or lungs, and yet at the time they did not realize that anything more serious was happening than a "choking" from the gas.

When nitrous fumes are inhaled, they act on the mucous membrane of the throat, larynx, and bronchi, and on the air cells of the lungs in much the same way as does a drop of nitric acid on the skin—that is, they produce a more or less severe burn. At first there is redness and smarting, and the natural effort to get rid of the irritant leads to choking and spasmodic coughing. An attack no worse than this is the mildest form of "fume sickness" and is very common in a guncotton or picric-acid factory, where in hot, heavy weather 1 man in every 20 on the shift may have to go to the dispensary for relief. Often this is easily effected, and he can go back to work again; or he may have to go home, and then some hours later the slower effects of the fumes may appear, inflammation of mucous surface with the pouring out of exudate. If the throat is the place affected, an edema

of the larynx may result. One of the cases inhaled rather concentrated fumes in the morning, and it was not till evening that he began to suffer from inflammation of the throat, which went on to edema, and necessitated intubation to prevent his strangling to death.

If the fumes have reached the bronchi, enough to damage them, a bronchitis results, with fever, lasting several days and sometimes passing into broncho-pneumonia. Though company physicians often refuse to admit that pneumonias among the men on the nitrating area are caused by the acid fumes, it is undeniably true, as has been shown by Dr. W. G. Hudson, of the E. I. Du Pont de Nemours Co., that fumes not concentrated sufficiently to cause rapid edema of the lungs may cause a lobar pneumonia. The effect is like that on the skin when a blister forms after a burn, only in the lung this means consolidation from the exudate—pneumonia. He warns physicians to look for such a pneumonia to develop some days even after the exposure, a statement we were able to confirm many times. Usually these pneumonias clear up readily unless there has been already some lesion in the lung tissue. For this reason and because Negroes are much more likely to have pulmonary tuberculosis than are whites the largest company prefers not to employ Negroes on the nitrating area. Other companies, unfortunately, seem to employ none but Negroes there.

One rather unusual instance of the slow effect of nitrous fumes was found on the records of a hospital near a large guncotton factory. It was a young man of only 20 years who was injured at the time of an explosion of nitrous gases and had to be dragged out of the nitrating shed through a window. He was exposed for some minutes to heavy fumes, but recovered promptly from the first effects. The next day he had a headache, but nothing else, and did not develop a cough until the fourth day. His symptoms increased rapidly in severity and he was taken to the hospital, where the physicians thought it a case of unusually malignant acute miliary tuberculosis, but when he died at the end of two weeks the autopsy showed gangrene of the lungs, undoubtedly a secondary result of the injury to the lungs by the nitrous fumes.

The typical form of fatal nitrous fume poisoning is a rapidly progressing congestion of the lungs accompanied by edema. There are many descriptions in the literature of this peculiarly distressing form of occupational disease. The usual history of such a case is as follows:

The man has a choking spell, perhaps no severer than he has had on other occasions. He recovers and goes home feeling fairly well and not at all apprehensive. Some hours later, often after he has gone to bed, he begins to "choke up," to cough, and be short of breath. Sometimes there are cramps in the abdomen and vomiting. One man was carried to a doctor's office unconscious and livid and gasp-

ing, with persistent vomiting and involuntary movements of the bowels. Usually, however, the symptoms are confined to the lungs. There is an increasingly intense air hunger. The man lies motionless, propped up on pillows, his face livid, his eyes full of fear, unable to speak or move, needing all his strength to labor for breath. At first his cough is dry, then he begins to expectorate a sticky, frothy fluid, which may be bloodstained. As the dyspnoea increases, his whole body may become livid. He gradually loses consciousness, and just before death there may be convulsions. An autopsy shows intense congestion of the finer bronchioles and air vesicles, which last are filled with an exudation of serum, the man being, as it is said, drowned in his own fluids.

Usually such cases follow some accident which has released an unusual quantity of these poisonous gases. One man, for instance, fell asleep in a nitrating shed, and when a fire occurred he was not discovered and dragged out until he had breathed enough fume to kill him. In another instance a plumber was sent for to install a fan in a picric-acid plant in order to carry off the nitrous fumes. To do this he had to stand on a platform above the nitration pots, and as work went on all the time the fumes were very thick. He was "choked up" and had to go out of doors to get his breath. The superintendent advised him to give up for the day, but he insisted on going back and finishing up for the day. Again he was overcome by the fumes and was sent home. He did not seem very ill and fell asleep, but during the night he awoke with the sense of strangling, and he died of suffocation in the morning.

In many instances, however, it is harder to explain these fatal cases for they follow upon no accident, no unusually severe exposure. The physician in charge of a large guncotton factory said that he always made a close inquiry into every serious and fatal case of fume poisoning and as a usual thing he would find that the man had apparently breathed no more fumes than he had often breathed before. The most puzzling cases in his experience were old hands who succumbed to what seemed to be no more excessive poisoning than they had repeatedly been exposed to without apparent injury. This points to a cumulative effect, or rather the production of heightened susceptibility. Others are highly susceptible from the beginning and suffer severely from an amount of fume which does not affect the ordinary workman at all.¹

One very hot night last summer the cotton in the waste acid from the nitraters in a guncotton factory took fire and two workmen in-

¹ This opinion is not universally held. One physician of much experience maintains that there can be no question of varying degrees of susceptibility to caustic fumes any more than to burning from fire, and that occurrences such as the above simply mean that the onlookers underestimated the degree of exposure.

haled a good deal of fume. Both were overcome and rendered unconscious, but one of them was back at work the next night, the other was laid up for a week with bronchitis. A man in a picric-acid plant was exposed to the fumes from a single "boil over." He developed a very serious form of congestion and edema of the lungs, very nearly fatal, while no other workman in the place was seriously affected. Another man in the same sort of work accidentally got to leeward of a thick cloud of fumes and breathed deeply. His symptoms came on at once and he was ill for the week with dyspnoea, acute emphysema, and rapid heart.

Men regularly employed by the more scrupulous and careful companies learn to take very short shallow breaths when exposed to nitrous fumes so as to save as much of the lung tissue as they can till they can escape to fresh air. But new men employed in plants where no instruction is given are likely to follow their natural impulse, to hold the breath as long as possible then take a deep gasping inspiration and hold it till forced to take another. A man who does this may drive the fumes into the whole area of the lungs. If even a small portion of the lung tissue is left unaffected he may pull through provided he is given oxygen until the inflammation has had time to subside. But we have records of 16 cases in which the congestion and edema were fatal.

There is also a less well recognized form of nitrogen oxide fume poisoning which is even more rapidly fatal. The poison in these cases acts directly on the respiratory center. This is probably the explanation for those cases of sudden death after very short exposure to fumes when an autopsy reveals no damage to the lungs sufficient to account for death. We had five cases reported to us of men who had worked only a short time in nitration, two of them less than one eight-hour shift, and had been suddenly overcome and died before medical care could be given.

Some light is thrown on these cases by the report of an autopsy performed by Dr. G. A. Apfelbach, of the Illinois State factory inspection department, for Dr. E. E. Evans, coroner of Lake County, Ind. This was an exceptionally big and muscular man, but a hard drinker, and just before applying for work at the guncotton plant he had a heavy drinking bout. He worked only one shift and during that time the nitrous fumes were not bad enough to make any of the other men apply for treatment at the company dispensary. He had worked about four hours in the nitrating room when he began to suffer from the fumes, went out into the open air and immediately became unconscious and died in about 30 minutes. Dr. Apfelbach found the lungs congested, edematous, the alveoli containing frothy fluid, the bronchi and trachea, hyperæmic, the larynx markedly reddened, heart absolutely negative, as were also stomach, intestines,

kidneys, and brain. The spleen was congested, and the blood was fluid and did not clot and was very dark in color. A tube full of blood was taken to Dr. McNally, chemist to the coroner's office of Cook County, who found a small quantity of nitric oxide but no methæmoglobin.

PICRIC ACID.

The two explosives that are attended with the greatest amount of poisoning from nitrous fumes are nitrocellulose and picric acid, and in some ways the latter seems the more dangerous. Picric acid can evidently be made with a very simple equipment, provided no attention is paid to the safety of the workmen, and in our investigation we saw men nitrating phenol to picric acid in ways which were primitive and very dangerous because of the escape of nitrous fumes. These were not always small plants, some employing hundreds of men. We found no nitrocellulose factory where conditions were as bad as they were in some of these hastily constructed and recklessly managed picric-acid plants. Another thing that makes this work worse than work in a guncotton factory is that in the latter the process begins and ends with a harmless substance, for guncotton is not poisonous to handle, while in the latter the process begins with one poison, phenol, and ends with another, picric acid.

Aside from the chief danger, nitrous fumes, there is a rather troublesome rash, "picric itch," and there is also a systemic poisoning which follows the breathing and swallowing of picric dust and probably also absorption through the skin. There may be respiratory disturbances, but much more often the symptoms are in the gastrointestinal tract and may be acute or chronic, in which latter case the man's nutrition may fall off so much that he may be advised to seek other work.

Two unusual and fairly serious cases of acute poisoning from picric acid resulting from repair work in the nitrating room were reported by Dr. T. H. Harrington, of the Massachusetts State Board of Labor and Industries. The men in both cases were incapacitated for over a fortnight, with pronounced nervous as well as gastric symptoms.

One fatal case was reported from a place where picric acid was made, but the man was supposed to have been exposed also to nitrobenzene fumes. He died in convulsions after he reached home and the autopsy record, which is very brief, states that the organs were congested with dark blood and the circulating blood was chocolate colored. Since both picric acid and nitrobenzene are nitro derivatives of the benzene group they are both capable of causing this condition of the blood, but the severe and rapid course of the poisoning is more suggestive of nitrobenzene than of picric acid.

PHENOL OR CARBOLIC ACID.

The manufacture of this chemical has assumed great proportions since the war began, and much of it has been used for the production of picric acid. This is bought by the French and used in their explosive melinite. The British picric-acid explosive is known as lyddite.

Phenol, or its salt, sodium phenylate or phenate, is a corrosive poison, but when absorbed it produces the symptoms characteristic of nitro derivatives of the benzene group. In chronic poisoning it seems to affect the kidneys severely, and also to set up grave nutritional disturbances. This was a fairly common form of poisoning during the early days of antiseptic surgery, when it was the custom for surgeons to perform all their operations under a fine spray of carbolic acid solution and then to dress the wound with carbolic solution and to use the same for irrigation. There were many instances of severe and even fatal poisoning following the washing out of a large wound with this solution or when leaving on too long a bandage saturated with it. There were also cases of nephritis among surgeons who were obliged to breathe in minute particles for hours each day. The symptoms of phenol poisoning are therefore well known.

In the manufacture and handling of phenol for picric acid there is some opportunity for inhaling small quantities from open receptacles, but the chief danger is from splashing and spilling. Phenol burns are common, and if too large a surface of the body is involved systemic effects come on. A very serious case of this sort was reported by the Massachusetts Board of Labor and Industries. The young man was a chemist 22 years old, employed in a plant making trinitrotoluene and picric acid. He had been employed there for five months. On a Sunday afternoon he went into the nitrating department for toluene and in that for picric acid, but as far as could be learned he was not affected by fumes in either place. At about 5.50 p. m., while leaving the phenol building, he stepped into a "sump" of phenol waste in the yard that he mistook for a board, and immersed his right leg in the solution up as high as the knee. He ran back and undressed, and washed and soaked his foot and leg in distilled water. Very shortly after he began to complain of ringing in his ears, dizziness, and difficulty in breathing. The skin of the leg had turned white, but there was no burn. He dressed the leg and left the building at 6.20 to go to the laboratory for alcohol to put on it. As he went out the men noticed that he seemed dazed, confused, excited, almost hysterical. Evidently he never reached the laboratory, for he was found the next morning on the road, dead. The autopsy showed the leg from foot to knee discolored, green and black. The diagnosis of phenol poisoning seems unavoidable in this case.

BENZENE AND TOLUENE, OR METHYL BENZENE.

A great deal of benzene is used in the manufacture of phenol, a smaller amount for the making of picric acid from phenol by one process not universally used, and for the manufacture of anilin to be used for detonating and stabilizing compounds. Toluene is used in great quantities for trinitrotoluene, and some is nitrated to the mono compound to be added to dynamite "dope" to lower the freezing point. We have included the two under one head because their effects on human beings are very similar, so much so that the authorities are divided as to which is more toxic. Rambousek¹ says that toluene produces narcosis more slowly than does benzene and there is less tendency to convulsions, Lehmann,² that narcosis comes on more quickly under toluene and passes away more slowly.

If a man is exposed to fumes from the spilling of a large quantity of benzene or toluene on the floor or a small quantity on his hands or clothes, he begins to feel the effects almost instantly. Dizziness comes on first, with slight confusion and ringing in the ears. Then if he can not get away from the source of the fumes he becomes violently excited and irrational and then loses consciousness, or there may be no stage of excitement if the fumes are excessively strong; he may faint away at once.

In distilling these bodies every precaution is taken to avoid letting the gases escape. The cases of accidental poisoning that we found among men employed in such works were caused by some unusual condition, the cleaning out of stills, the making of repairs in pipes or in stills which were not first thoroughly cleaned. But the majority of these cases followed the use of the compound in making some explosive or in making phenol.

Slight cases of poisoning attract little attention, and we could not secure histories of any but very serious ones, 12 in number, 5 of them ending in death. The symptoms in these cases pointed to a profound involvement of the central nervous system and, in addition, an effect on the capillary blood vessels, which has been explained as a direct solvent action on the walls leading to the capillary hemorrhages. These are seen as purpuric spots on the skin and are characteristic of poisoning from some of the derivatives of these bodies as well, such as trinitrotoluene. There are also changes in the blood, the most striking being a loss in white blood corpuscles.

The following is a typical instance of benzene poisoning of the acute, severe variety. Two steam fitters were repairing a benzene still. The manhole through which they had crawled was just large

¹ Rambousek. Industrial poisoning from fumes, gases, and poisons of manufacturing processes. London, Edward Arnold, 1913, pp. 205, 206.

² Lehmann. *Archive für Hygiene*, 1911, vol. 74, p. 1.

enough to admit a man's body. As is usual, the still had been not only emptied but washed out, and was supposed to be free from harmful quantities of benzene. One of the men suddenly grew excited and irrational, singing and shouting. It was seen that he must be removed, but this was difficult to do through the small opening, since he did nothing to help himself. It took about 10 minutes to get him out, and during much of that time the manhole was completely closed by his body. When he was at last dragged out it was found that his comrade, who had been helping, was lying unconscious at the bottom of the still. Even more difficulty was experienced in removing him, and it took about 20 minutes before he was brought into the open air, dead.

An almost exactly similar occurrence took place in a phenol plant, where benzene is redistilled. In this instance the workman who was inside the still the shorter time was the one who died. Two other fatal cases came from the sulphonating department of a hastily constructed and poorly managed phenol factory, where defective equipment allowed benzene fumes, in dangerous quantities, to escape.

NITRO AND AMIDO COMPOUNDS OF THE BENZENE GROUP.

Several of this group of toxic substances are used in the manufacture of explosives, the following being the most important:

Nitrobenzenes.	Amidobenzene or anilin.
Nitrotoluenes.	Diamidobenzene or diphenylamin.
Nitronaphthalenes.	Tetranitranilin.
Nitrophenols.	Tetranitromethylanilin.
Nitrochlorbenzenes.	

Curschman says the poisonousness of these bodies increases with the degree of nitration except when, as is the case with the nitrotoluenes, the lower nitrated products are more volatile than the higher.

All the nitro and amido compounds of the benzene series give rise in varying degree to a very well defined and characteristic form of poisoning which depends upon the direct action on the central nervous system and upon certain blood changes, the most important of which is the formation of methæmoglobin. This replacement of oxyhaemoglobin, with its easily released oxygen, by methæmoglobin, with its closely bound oxygen, interferes with the normal exchange of gases on which life depends and a condition of internal suffocation results, a starvation for oxygen in the presence of abundant air. The most striking symptom is a bluish color of the lips and of the lobes of the ears, while the general tint of the skin is yellowish, and the whites of the eyes are often yellow. This yellowish tint is a symptom of jaundice, but it is often masked by the local effect of some of these compounds on the skin, such, for instance, as trinitro-

toluene and picric acid and tetranitranilin, which dye the hands and hair and eyebrows, even the skin of the face, a dirty yellow.

This dyeing of the skin is so very striking that people are apt to regard it as a serious symptom, but to the physician it means only a guide to the kind of work a man is doing. The color he looks for is in the whites of the eyes.

In mild cases of intoxication by these compounds there is a throbbing headache, sense of fullness in the head, flushing of the face, dizziness, a feeling of weakness, especially in the legs, and more or less nausea, sometimes vomiting. Such an attack is what the workmen call a "jag," and they expect to get over it in a few hours, though a feeling of malaise will probably persist for all of the next day. Some men who handle one of these compounds have had many such attacks without apparently suffering any real impairment of their health. If the poisoning is more serious, the dizziness and weakness increase, the flushed face becomes deeply cyanosed, and there is loss of consciousness that may last several hours and be accompanied by convulsions, though this latter is rare. A characteristic feature of this group of poisons is the effect on the urine which becomes dark or a greenish or a reddish brown. The blood becomes chocolate colored, and if examined in the spectroscope shows the absorption bands of methæmoglobin. It is also characteristic to find changes in the red blood corpuscles, evidences of destruction with efforts of regeneration, as shown by the great variation in size, the pale color, the appearance of free blood pigment, of nucleated red blood corpuscles and of cells stippled with basophilic granules. A profound anemia may occur if poisoning is prolonged.

All of the group have an irritating action on the skin setting up a dermatitis, which may be slight or may be bad enough to incapacitate a man for a few days, indeed, men very susceptible to such skin affections may have to give up the work. The drier the product the more trouble of this kind, and hot weather makes it much worse.

Exposure to any of these compounds may set up the symptoms we have described, but some of the compounds give far more trouble than others in the manufacture of explosives. Anilin was found to be the cause of many cases of slight poisoning, but of no serious trouble. Nitronaphthalene fumes had not, so far as we could ascertain, given rise to actual illness, in fact one workman who was handling it and who had formerly used mononitrotoluene in dynamite dope said that while he had suffered a good deal from the latter he had not felt any effect from nitronaphthalene. Nitrochlorbenzene, diphenylamin, tetranitromethylanilin, and tetranitranilin were not apparently productive of anything more serious than trade eczema. Of course, none of these is manufactured on a large scale; they were each found in only one or two factories and, except anilin,

had not been manufactured there for more than a year, which is very likely the reason why so little damage has been done by them.

The nitrobenzenes are not important in the explosives industry, though we have on our list a few cases of poisoning from two plants.

It is cheaper to nitrate toluene than benzene for this purpose, and therefore trinitrotoluene is the important member of this group.

TRINITROTOLUENE OR TOLUOL OR TRITON OR TROTYL OR TNT.

Next to the oxides of nitrogen this substance has been responsible for more cases of poisoning in our explosives industry than any other, and the form of poisoning caused by trinitrotoluene is serious enough to give it an important place quite aside from the number of its victims.

The danger of nitrous fumes is present in the manufacture of this substance, but not to a very great extent. Nitration of toluene is carried on in closed retorts and the escape of fumes is not incident to the process, but is the result of some accident—a “boil over” because of too rapid nitration or a leak in the acid supply.

The typical danger in this work, however, is not nitrous-fume poison but the effect of trinitrotoluene itself. Aside from the attacks of cyanosis, with involvement of the nervous system, which were described above, there are vaguer and less characteristic symptoms caused by exposure to triton fumes or dust. It is probable that these symptoms are not peculiar to trinitrotoluene poisoning; that if large numbers of men and women were exposed for many months to the action of other members of this group of nitro derivatives the same symptoms would appear.

Men and women working in an atmosphere of triton dust may have irritation of eyes, nose, throat, and bronchial tubes, and the sputum from such cases, if dropped into water, often stains the water yellow, showing the presence of the dye. But the commonest form of poisoning from TNT is the gastrointestinal. Indeed, some experienced foremen think that a distaste for food is the earliest and commonest symptom of triton poisoning. Part of this distaste for food may come from the bitter taste in the mouth which triton dust causes. Later there are griping pains, headaches, nausea, sometimes vomiting, constipation, and, more rarely, diarrhea. So general is this intestinal type of poisoning that we are forced to believe a physician is failing to recognize the real nature of many of his cases when he tells us he has seen only the cyanotic form of triton poisoning in his plant.

Other physicians lay great stress on the bladder symptoms, finding cystitis a frequent but usually quite controllable condition. In more serious cases the poison affects the kidneys and there is a fatty degeneration of the tubular epithelium as shown by casts in the urine.

As in all this group of poisons, dark-colored urine is usual, and both blood pigment and bile pigment have been found in the urine.

If the disease progresses the patient's color becomes jaundiced. Inability to keep food on the stomach increases. There is persistent nausea, attacks of faintness, bluish color of the lips, heightened blood pressure, sometimes severe nosebleed, and swelling of feet and legs, sometimes of the hands. The urine then contains albumen and casts. One woman was seen who had had such an attack and had recovered, but other cases had a fatal termination.

Death from triton poisoning is in some instances very sudden and the symptoms are such as accompany acute fatal poisoning from the other members of this group of poisons. In other instances the illness lasts longer and the case is more like that of slow benzene poisoning as it is described in the literature. Both types were found among the fatal cases that were reported to us. There were those who developed marked nervous symptoms within a few hours of exposure to unusually large amounts of fume, cyanosis, dizziness, mental disturbance, convulsions, coma, and death after less than 24 hours, the autopsy showing dark fluid blood, sometimes chocolate colored, edema of the lungs, though not enough to cause death, and congestion of the abdominal organs. Then there were others of quite a different history; men and women who were ill for several weeks with gastric trouble, chiefly, and who at the outset showed nothing to make the attending doctor feel that this was an unusual case. Then there was a sudden turn for the worse, jaundice set in, with signs of kidney degeneration as well, and soon a clinical picture developed characteristic of acute yellow atrophy of liver. This is what the British in their factory inspection reports call "toxic jaundice." Autopsy showed the changes one would expect of slow poisoning, extreme fatty degeneration of liver cells with atrophy, degeneration of kidney epithelium, often hemorrhages into serous surfaces and into the subcutaneous tissue.

Two cases that were not autopsied presented after death a picture of toxic jaundice and were diagnosed as yellow atrophy of the liver. There was intense generalized jaundice and tiny capillary hemorrhages thickly distributed over chest and abdomen just beneath the skin. The liver had perceptibly diminished in size. The symptoms preceding death were apparently identical in all respects with acute yellow atrophy of the liver, beginning with general physical ill feeling, then marked gastrointestinal disturbance, griping pains across the abdomen, increasing jaundice, fever, delirium, coma, and death.

Among the fatal cases were two women engaged in filling shells with triton. The first one was 19 years old. She had been dipping charges in paraffin for some months and was then transferred to office work for two weeks. Her illness developed after she had left the

triton department. At first she had only the usual symptoms, such as nausea and constipation, but no jaundice. She even grew better. Then 10 days after her last visit to the company physician the latter was sent for and found her comatose with golden yellow jaundice and absolute suppression of urine. She had vomited persistently. She died the next day after 12 hours of profound coma. The physician had reason to believe that she had had some kidney derangement before going to work in the plant.

The second case was a girl of 20, tuberculous, her father and brother both having died recently of tuberculosis after long illness. She had paraffined and scraped charges for several months and had suffered from cystitis. She had several hemorrhages from the lungs and a profuse one was the immediate cause of her death, but the blood was thick and deep brown in color showing the triton poisoning.

Two cases rather similar to these occurred in men; one died of pulmonary hemorrhage while suffering from triton poison, the other, a man of 62, died of nephritis after only two weeks' work in nitrating toluene. In both cases the triton was looked upon as the real cause of death by the physician in charge.

In order to detect the earliest stage of this form of poisoning some doctors look for a bluish color in the lips and lobes of the ears; others for yellowing of the whites of the eyes; others for loss of appetite and a bitter taste. In all well-managed factories the physician is permitted to pick out these men and have them transferred to other work. One company has even laid out gardens on the factory grounds and the physician prescribes gardening for men who must be kept out of the atmosphere of triton for a while and who in this way can be under his observation and engaged in healthful occupation. There is reason to believe that such careful supervision of the men's health is not only humane but a part of good business management. There is a much smaller labor turnover in this plant than in a certain trinitrotoluene shell-filling factory where the physician refuses to transfer men who are in only the early stages of the disease; of course labor turnover is very wasteful.

Trinitrotoluene is no exception to the general rule that all poisons act more energetically in hot weather than in cold. July and August of last year saw a decided increase of poisoning in most of these plants. In one, the record for June was 23 cases; for July, 55 cases; for August, 69; and for September, 35. The heat was not alone responsible here, for during June they began to work the men overtime, the usual shift being eight hours. The overtime work lasted through July and August and began to fall off in September so that the marked increase during the two hot months was probably caused by fatigue as well as by the heat. In contrast to this, another plant adopted the opposite policy and during those two hot months put on

four shifts of men instead of three, each shift working only six hours. As a result they had far fewer cases of poisoning than during the cooler summer of 1915.

Of course all the cases of triton poison in this country must have developed rather rapidly because the industry is so new here. Most of our reports do not run back for more than eight or nine months, since even when work had started before that date no physician was put in charge until later on. Fifty cases from the records of one physician had all worked less than eight months and he mentioned as decidedly exceptional a man who had handled TNT for more than eight months and was still perfectly well.

NITROGLYCERIN.

Important as is this explosive in industry, it is of comparatively little importance from our point of view, because there is little illness to be feared in a plant making nitroglycerin. The constant danger of explosion leads to very careful nitration since decomposition with the evolution of poisonous fumes would be highly dangerous. It also leads to a separation of processes, so that as few men as possible shall be employed in any one building.

Aside from the ever-present risk of nitric acid spilling or leaking, and of the use of some poisonous compound—nitrotoluene or nitronaphthalene for instance—in the “dope,” the only occupational illness to be expected in making nitroglycerin is the severe, throbbing headache from which the men suffer before they become accustomed to the effects and again when they return to work after an absence of several days. Nitroglycerin is regarded by physicians as a powerfully depressant drug, but strangely enough it does not seem to be the cause of cardiovascular disturbances of any seriousness in nitroglycerin workers.

FULMINATE OF MERCURY.

This is a very highly explosive compound, but like nitroglycerin, much more likely to cause accidents than occupational disease. An irritating dermatitis is the only effect to be observed in the men and women who handle it in filling percussion caps. Far more men than women show this eczema-like eruption, probably because women take more trouble to avoid the disfigurement. In one munitions factory employing both men and women there were only 32 cases of “fulminate itch” among 1,070 women and 36 among 505 men.

SULPHURIC ETHER.

In making smokeless powder from guncotton the solvent used is ether mixed with alcohol, except for rifle powder, when amyl acetate is the solvent, or for the mixed “n. g.” powders, when acetone is gen-

erally used.¹ The alcohol for this purpose is, so far as we have seen, always ethyl alcohol, never methyl.

The fumes of the alcohol in the early processes of making smokeless powder are sometimes strong enough to make the men somewhat drunk, but the ether fumes are more serious in their effect. A new hand suffers a good deal from mild ether poisoning. He passes through all the stages of narcosis as they are known to the anæsthetist—the slowly increasing confusion, excitement, which may make the man almost uncontrollable for a short time, then the gradual dulling of the senses and drowsiness, passing into stupor and unconsciousness. The physician, even if he be on the grounds, seldom sees the man in the stage of excitement; usually by the time he has reached the office the man is already stupid. There is no treatment for this condition beyond allowing him to sleep it off in fresh air. Occasionally cases are sent to hospitals, if the narcosis is unduly prolonged, and we have records of one case in which unconsciousness lasted for 24 hours. There may be heart symptoms needing medical care, for a very rapid pulse is not uncommon.

The two most serious cases of ether poisoning which came to our knowledge were lads who had recklessly and unnecessarily exposed themselves to ether fumes. They had gone into one of the small buildings where ether is condensed from smokeless powder—"solvent-recovery houses" they are called—and had climbed up on one of the solvent-recovery bins, where it was warm and comfortable. They lay down near a manhole which was supposedly well closed, with a rubber gasket, but there must have been some escape of fumes, for, after reading a while, they both fell asleep. They were found after they had been there less than an hour and a half, and both were in an alarming condition, respiration only 6 or 8 a minute, pulse down to 30. Two hours' work with the pulmotor brought them around, and they were apparently none the worse for their experience.

The usual aftereffects of ether anæsthesia follow ether poisoning in industry. The next day the man is somewhat nauseated, has headache, can not eat, is generally wretched, and has pains in his back. Often he becomes accustomed to the fumes and does not seem to be injured in any way by his repeated exposure of many hours each day. On the other hand, there are men who can not get used to it.

A case of chronic ether poisoning was reported by a physician practicing in the neighborhood of this same plant. The man had worked there for three months, and was then suffering from albuminuria and puffed eyelids. He had never had these symptoms before. The physician had also had two patients with uræmia, both ether workers.

¹ Diphenylamine may be added to the ether-alcohol mixture, to act as a stabilizer. In such cases the symptoms resulting from inhalation of the solvent would be complicated by the presence of this member of the amido group of poisons.

One of them had syphilis and his kidneys were undoubtedly already damaged when he went to work there, but the other had been in perfect health. The former died of uræmic convulsions.

Another form of chronic ether poisoning affects the digestion and general nutrition chiefly. A man who had been in charge of a smokeless powder works for six months gave his symptoms as follows: He lost his appetite, partly because he tasted ether all the time. His breath smelt of it all the time. After about three months he began to grow apathetic and listless. He felt tired out and was chronically constipated. He lost 20 pounds and decided to leave the place. After taking up other work he was constipated for several months, but his appetite came back and gradually he regained his normal condition.

Most physicians and practically all superintendents and foremen believe that if a man can become accustomed to the ether so that he no longer gets a "jag," or only rarely, he will not be injured in any way by months or even years of such work. They point to the fact that some of the ether men actually gain in weight under the influence of the work. But experimental evidence, for which there is not space here, tends to throw doubt on this optimistic theory and to indicate that definite damage to organs may occur as a result of long-continued absorption of ether fumes.¹

The other poisons found in this industry do not need more than a brief mention. The dangers of nitric-acid manufacture were covered fairly completely in the section on nitrous fumes. The making of sulphuric acid is attended with some danger from the fumes of sulphur dioxide. Other dangerous vapors which are occasionally met with are chlorine gas, given off in the first stage of nitric-acid manufacture; ammonia gas, if there is an accident to the ammonia supply in the making of ammonium nitrate. Then there are less dangerous fumes, such as ethyl nitrite, formed when alcohol is added to mercuric nitrate to form fulminate; amyl acetate, used for smokeless rifle powder; acetone—if indeed acetone is poisonous—used in making mixed powders.

Ammonium nitrate, added to dynamite to lower the freezing point, and also as a constituent of the charge for certain high-explosive shells, has been blamed for causing illness among the workmen filling these shells, but this is highly improbable. Also TNT is another constituent of the charge and may well be held responsible for all the ill effects.

Mercury is a well-recognized poison, but in this industry it gives rise to little trouble, since it is handled by very few men in the course of making mercuric nitrate for fulminate.

The same thing is true of wood alcohol, which was found in two plants only, for the manufacture of dimethylanilin as a step to

¹ See René Sand. II^e Congrès International des Maladies Professionnelles, Bruxelles, 10-14 septembre 1910. Rapports et Communications. Bruxelles, 1912.

tetranitromethylanilin. As it was handled there, only an accident would result in poisoning.

PREVENTION OF INDUSTRIAL POISONING.

This resolves itself into the prevention of fumes and dust and the provision of ample facilities for personal cleanliness. These poisons are absorbed through the skin, and therefore the workmen must bathe often and change their working clothes when they leave the plant. One hears tales of men renting rooms and sharing them with men on the other two shifts, so that the bed is never cold, nor do they undress to go to bed but lie down in the clothes in which they have worked their shift. It is often said that the men can not be induced to use the baths provided for them, but if some employers can succeed others can. One toluene nitrating plant last summer kept a bath record and found that 95 per cent of the men were bathing daily. It is sometimes the lack of privacy that keeps Slavic and Latin workmen from using the showers, for they are not used to bathing together as boys.

Fumes can be carried off only by well-planned exhausts placed as near the point of formation of the fumes as possible. It is unnecessary to say that the escape of fumes can often be prevented by tight closing of kettles, etc.

Dust seems to be difficult to deal with. It is probably worse than fumes in triton works, because the presence of dust means not only absorption through breathing and swallowing but also through the skin. Yet a great deal can be done to prevent dust poisoning by properly shielding dust-producing machines and carrying off the dust through exhausts and by abolishing dry sweeping. A vacuum cleaner is best, but if that is not available, sprinkling before sweeping should be the rule.

Many companies go to great expense in providing the men with rubber-sponge respirators, but, though these are undoubtedly good in emergency when an unusual amount of fume or dust must be encountered for a short time, they can not be depended on to protect a man against the fume and dust to which he is exposed throughout his shift of work. A respirator which would really shut out the dust would not admit enough air, and then the man could wear it only for a few minutes and then be forced to push it up on his forehead, where, as a matter of fact, most men do wear their respirators. If conditions in a factory require continual protection of that sort, then it is the conditions that should be changed, for respirators will not save the workmen from the effects of the dust and fume. British and German experts have long since decided that for continuous use a pad of cheesecloth worn over mouth and nose and changed daily is far better than any mechanical device.

Some poison undoubtedly enters the body from dirty fingers if the man eats his lunch without washing. A lunch room should be provided in every factory in which poisonous substances are handled, and even if the men do not use it, they should be forbidden to eat in workrooms. Some superintendents manage to make their men wash before eating by seeing that the lunch boxes are left in the locker room which must be approached through the lavatory.

A physician should be attached to every such factory, and he should not only be on hand for consultation by the men, but should make rounds through the plant to learn what are the conditions under which work is done and to look for incipient cases which would not of themselves come to him so soon. He should be authorized to demand the removal of a man who begins to show the effects of his work. He should also ascertain, so far as possible, what men have left work on account of illness, and follow up the case to see if it is occupational, for in no other way can he know just how much danger is connected with work in the factory and which are the special danger spots.

There is not as a usual thing much if any instruction given the men in this industry as to how to protect themselves against the dangers of sickness. Indeed in some no instruction at all seems to be given, perhaps for fear of frightening away the men at a time when labor is scarce. Men working in a large triton shell plant said they had never even been told the stuff was poisonous. On the other hand, a great guncotton plant has a regular system of instruction for the force, taking the men according to departments and giving them lectures in English and in their own languages, explaining the dangers peculiar to the departments in which they work. So far as possible, these talks are illustrated by stereopticon pictures. The effect is shown by their report of fume sickness for five months. The first month there were 266 cases among 660 men; the fifth month, 24 cases among 621 men.

Fatigue quickens and strengthens the effect of poisons. Overtime work has already been referred to as increasing sickness, but there are factories that, without any overtime, work their men to the point of dangerous fatigue. Four were found that had but two shifts in the 24 hours and one of these even urged the men to work overtime, for 14 or 16 hours, because labor was so hard to get.

Men with lesions in lungs or kidneys will be unduly endangered by work of this character and should be discharged as soon as the condition is discovered. The same is true of alcoholics, their resistance to these poisons is far below the average, and they should not be employed on such work.

INTERNATIONAL RELATIONS OF LABOR DURING THE WAR.

Inasmuch as the European war severed the diplomatic relations of all countries involved in it, so also did it threaten to disrupt the organized relations which existed between the various trade-unions of those countries. The years of effort which had been necessary to bring about affiliation between the trade-unions of the different countries seemed likely to be wasted. This result, however, did not come about, although relations of the national federations with one another have been virtually suspended during the two and one-half years of war. Indirectly, however, their relations continued by communication through organizations in neutral countries. President Legien, of the International Federation, in November, 1914, announced that the regular work of the international organization would be discontinued and the funds be used for the purpose of maintaining the organization, and not for propaganda; and that the president of the Dutch Trade-Union Center, Mr. J. Oudegeest, would be the intermediary through whom he would communicate with the various affiliated national trade-unions. The federations in neutral countries continued to send in their contributions to the general treasury. The leading official periodicals representing the different international organizations of the various trades continued to appear, and were received for a time, though somewhat irregularly, by this bureau. (The largest proportion of them are published in Germany.)

The extent of the international trade-union movement may be gathered from the fact that there were 29 trade-union federations affiliated with the International Federation of Trade-Unions, whose headquarters were at Berlin, together with the 6 federations in the States of the Commonwealth of Australia, making in all 35 national federations so affiliated. These federations, according to the 1914 directory of international trade-unions, the most recently compiled, are those of Great Britain, France, Germany, Netherlands, Belgium, Denmark, Norway, Sweden, Finland, Austria, Bosnia, Herzegovina, Hungary, Croatia, Roumania, Bulgaria, Switzerland, Italy, Spain, Portugal, and the United States (American Federation of Labor), those of Argentina, with two federations, and of Brazil, Transvaal, Turkey, Commonwealth of Australia, New Zealand, and Japan. In addition to the general trade federations which comprise organizations of different trades within the respective countries there are affiliated with the international office 32 federations in different countries which comprise only unions representing a particular trade, i. e., strictly trade federations as distinguished from general federations which comprise various trades. The International Federation of Trade-Unions claims an affiliated membership of approximately 7,500,000.

The headquarters of the international movement, known as the International Secretariat of National Trade-Union Centers, was located at Berlin. The secretariat has published a semimonthly periodical since 1913, called the *International News Letter*, which is printed in French, English, and German. Its publication was suspended shortly after the war broke out, but was resumed again in August, 1915. The English edition was received currently by this bureau from Amsterdam, Netherlands, its temporary address during the war, as late as November 17, 1915.

Important matters for the international labor movement early developed after the outbreak of the war. The question of changing the headquarters of the international federation from Berlin to a neutral country, preferably Switzerland,¹ was among the first.

The question was first broached in a conference, February 15, 1915, in London, which was convened by the socialist and labor parties of France and England. Neither the General Federation of Trade-Unions of Great Britain, nor the *Confédération Générale du Travail* of France, was said to be responsible for convening this conference, but the delegates from the French *Confédération*, who agreed to attend rather than leave themselves open to criticism, were instructed to confer with the British Federation of Trade-Unions, concerning the transfer of the international secretariat. A joint letter dated from London, February 16, 1915, to President Gompers of the American Federation of Labor, and signed by the secretaries of the British and French federations, respectively, reports the discussion which took place at the conference.

There was no sign of personal animosity toward the German people, but all present agreed that racial bitterness had been engendered and would affect, amongst many other things, the position and usefulness of the international trade-union movement. It was obvious to all that years must pass before British and Belgian and French could proceed to Berlin with the freedom and confidence which existed prior to the outbreak of the war. Some new arrangement was therefore necessary if the international movement was to avoid disintegration and disaster.

All thought that the international secretariat should, at least for a time, have its chief office in a country whose neutrality was guaranteed not only by treaty, but by geographical circumstances. America would have afforded an ideal solution but for her distance from other centers. Outside America, Switzerland appeared to be the country best suited to the requirements of the secretariat, and though the French preferred Geneva, they waived the consideration of this city when it was pointed out that its Latin sympathies might make it objectionable to Germany. Ultimately it was agreed to epitomize and place before you [President Gompers] the suggestions made, and to ask you to assume the responsibility of forwarding them to Legien [president of the

¹ The *American Federationist*, Washington, 1915, vol. 22 (November, 1915); Report of the proceedings of the thirty-fifth annual convention of the American Federation of Labor, held at San Francisco, Cal., Nov. 8 to 22, inclusive, 1915. Washington, 1916. Pp. 48-55.

International Federation at Berlin]. All present felt that he would appreciate the situation. The representatives thought that the chief office of the secretariat should be removed to a neutral country, preferably Switzerland; that the personnel of the secretariat should be neutral and resident in Berne. * * *

There is not the slightest personal feeling against Legien, and it is understood that the arrangement suggested may be only temporary * * *.

Inasmuch as the secretaries of both the British and French federations appreciated fully the gravity of the situation and the desirability of avoiding dismemberment of the international trade-union movement, they requested President Gompers to present this matter to Mr. Legien.

In reply to this communication the president of the American Federation of Labor, in a letter dated March 4, 1915, to the secretary of the General Federation of Trade-Unions of Great Britain, stated that the plan suggested was "eminently practicable and in the best interest of the international trade-union movement." President Gompers also wrote to Legien and laid the matter fully before him. The course which President Gompers pursued was subsequently endorsed by the executive council of the American Federation of Labor, and the suggestion offered that provision be made in the future for the automatic neutralization of the international office upon the occurrence of a war.

The reply of Mr. Legien, the president of the International Federation of Trade-Unions, of April 12, 1915, through the president of the American Federation of Labor, concerning the proposed change of headquarters for the International Union, ran as follows:

I am very much surprised to hear of the proposition emanating from the conference of representatives in some trade-union centers which was held in London in February last, to the effect that the headquarters of the International Federation of Trade-Unions should be removed to Switzerland.

The central organ of the German Social Democratic Party, the *Vorwärts*, in Berlin, and a few provincial papers of the same quality, as well as the official paper of the Social Democratic Party in Switzerland, the *Berner Tagwacht*, have indeed made an effort, which was bound to be in vain, of course, to discover that the means at the disposal of the International Federation of Trade-Unions were wrongly used in the interest of Germany alone. Those taking part in the London conference, however, should not have permitted themselves to be led astray by these endeavors. * * *

His (Legien's) first impression was that the proposition was a matter which should not be decided by vote through correspondence, but only after a thorough and personal conference, in which the whole question could be discussed. He felt that to change the headquarters of the international secretariat at that time, under the existing conditions, would be an expression of lack of confidence which would in the future have a harmful effect upon the whole movement.

The chief difficulty lay in the fact that the change desired had to be secured through a conference of the various national federations

according to the present constitution of the international federation. Such a conference was called by the international president for April 13, 1915, through the national trade-union centers at Amsterdam. This conference, if held, would have been attended by only a small portion of the national federations, probably only those of Germany and the Scandinavian countries. Therefore the decision of such a conference would be of limited effect. Mr. Legien's proposal to hold a conference in Amsterdam did not, therefore, meet with general approval. Mr. Appleton, of the British federation, in writing to Mr. Oudegeest upon the subject, stated that Mr. Legien did not appreciate the bitterness that the war had engendered in Great Britain and France, and that it would be useless to ask the people to agree to a conference.

Independent action in the interim before the receipt of Mr. Legien's letter was taken by the trade-union centers of Great Britain and France in order to secure the opinion of the other trade-union centers concerning the transfer of the headquarters. This action was taken by means of a circular letter dated May 14, 1915, in which was expressed the hope that after the war international trade-unionism would be rehabilitated in spite of racial animosities and the spirit of vengeance which has been aroused. Economic pressure, it was urged, would compel the workers to organize internationally, but it was hopeless to expect "that the representatives of the countries now fighting each other can go to Berlin as freely and with as much usefulness as they have gone in the past. Even though the leaders themselves were able to subordinate all feelings except those of devotion to the international movement, it is certain that they would not be able to command the general and immediate support of those whom they represent." The circular letter disclaims any suggestion that this proposed change in the headquarters is in any way meant as a reflection upon the president of the international federation, for "we are conscious of the efforts and sacrifices he has made on behalf of the trade-union movement."

INTERNATIONAL CONFERENCE AT LEEDS.¹

The proposal was made to convene an international conference in August or early September for the purpose of changing the headquarters of the international federation from Berlin to Berne, Switzerland. No conference was held at that time, but one was subsequently called to be held in London. It grew out of a gathering of representatives of British, Italian, Belgian, and French labor organizations in Paris on May 1, 1916, attended by delegates from the allied countries only, who met also to discuss the proposal of the

¹ La Typographie française; organe officiel de la Fédération française des travailleurs du livre. Paris, 1916 : 35 année, No. 815 (Sept. 1-Oct. 16) ; No. 817 (Nov. 1-Dec. 16).

American Federation of Labor to call a meeting of representatives of organized labor of the different countries at the same time and place as the diplomats meet to discuss the terms of peace at the end of the war. At this meeting in May, 1916, in Paris, the *Confédération Générale du Travail* of France was instructed to draw up a report to be submitted for the examination and discussion of the conference.¹

The conference, ultimately called at Leeds, July, 1916, was attended by representatives of the labor movements of England, France, Italy, and Belgium. On the question of neutralization of the international federation the conference adopted unanimously the following resolution:

The delegates of the British, French, Italian, and Belgian trade-union organizations having approved that steps be taken for the transfer, during the war, of the international secretariat to a neutral country and for the appointment of a personnel of neutral nationality for its administration, the central organizations are herewith authorized to undertake the putting in effect of the required measures.

The conference, moreover, resolves that a provisional central bureau of correspondence between labor organizations of the allied countries be established. This bureau shall maintain relations with all the various labor movements of the allied countries so that their activities may be coordinated in order to obtain in common improved conditions for the working people.

The resolution was adopted after a stormy discussion, it is stated, several delegates declaring that even after the termination of the war it would be impossible to take up relations with the German trade-unions. Jouhaux, the secretary of the *Confédération Générale du Travail*, affirmed, however, his conviction that after the conclusion of the war the international federation could not properly continue its functions and attain its object unless the trade-unions of all nations, including Germany, were represented. His view prevailed in the end.

Under date of October 4, 1916, President Legien wrote from Germany to the thirty-sixth annual convention of the American Federation of Labor at Baltimore, November, 1916, and referred to this Leeds conference of July, 1916, as an incident which appeared to be breaking up the international trade-union movement. He characterized the resolution as one "which would be identical to the establishing of a new international organization for the four countries named."² He saw no need for it, as relations through the Amsterdam branch continued to be maintained. Neither a neutral power

¹ General Federation of Trade-Unions (Great Britain). Conference of delegates from the general federations of trade-unions of the allied countries. Historical survey of the efforts to coordinate and internationalize labor legislation. Prepared by the *Confédération Générale du Travail*, June, 1916. London, 1916. 15 pp.

² Report of proceedings of the Thirty-sixth Annual Convention of the American Federation of Labor, held at Baltimore, Md., Nov. 13 to 25, 1916. Washington, 1916. P. 257.

nor the central powers had proposed a conference for changing the headquarters of the international federation.

PROPOSED WORLD LABOR CONGRESS.

Another matter of importance to the international labor movement was the proposal in 1914 before the Philadelphia convention of the American Federation of Labor for a world labor congress to be held at the same time and place as the peace conference at the end of the war. At the San Francisco convention in 1915 the executive council of the American Federation of Labor submitted a plan for the holding of such a congress. The plan recommended was adopted and the executive council instructed to make all arrangements for holding it. In order to carry out the instructions of the convention the executive council prepared a statement setting forth the scope of such a world labor congress and the tentative plan as indorsed by the San Francisco convention. This statement was published in the form of a circular letter and sent in various languages to the organized labor movements of all those countries for which the names and addresses of officers could be secured. During the course of the year many letters of inquiry and approval were received from various countries. The plan was affirmed by the national federations in France, Australia, and South Africa. It was not approved by the organized labor movement of Great Britain, and President Legien of the Federation of Trade-Unions of Germany held it of doubtful practicability. He had previously privately stated in a letter dated April 2, 1915, to President Gompers:

Our direct influence on these negotiations, moreover, will probably carry no weight. Indeed, we all have permitted ourselves to be deceived as to the actual power of our labor organizations. We shall have to develop this power and make it sufficiently strong to avert a similar conflict in the future, as soon as our common work is started again at the end of this war.¹

The proposal of the American Federation of Labor was subsequently abandoned.

When information of the official rejection of the plan for the holding of a world labor congress reached this country, because of the importance of the plan and because of the possible influence that a representation of wage earners might have upon the deliberations of the world peace congress, it was proposed by the executive council of the American Federation of Labor and incorporated in its report to the thirty-sixth annual convention of this organization, at Baltimore, 1916, that organized labor in both belligerent and neutral countries attempt to participate in the peace negotiations through

¹American Federationist, Washington, 1915. Vol. 22 (November), p. 943.

official commissions from their respective organizations. This plan and the grounds for it are thus set forth:

Since the first proposal submitted by the American Federation of Labor to the labor organizations of Europe has been definitely rejected by them, we suggest that the organized labor movements of those countries that shall participate in the general peace conference to determine terms and conditions of peace at the close of the war shall urge upon their respective Governments that the wage earners shall be represented in an official commission from their respective countries. The same policy ought to be pursued also by organized labor movements of neutral countries, if it shall be determined that neutral countries also will participate in the general peace congress.

Thus representatives of wage earners would be seated with other representatives of the nations in general conferences connected with the formulation of peace terms. In this way the ideals and needs of wage earners would be presented and considered by the general official body.¹

The conference at Leeds, July, 1916, already referred to, took up this proposal of the American Federation of Labor. The discussion of the question is said to have been very protracted. The British delegates did not share the view of the French. They attacked the plan as one which no government would tolerate, as its realization would greatly embarrass the peace conference. The resolutions of the labor congress would, moreover, reach their destination too late to be considered by the diplomats.

The delegates next turned their attention to a discussion of the questions which were intended to form the program of such an international congress. The French *Confédération Générale du Travail* had drafted an historical résumé of the attempts to coordinate labor legislation through international agreement. This summary was prepared as a guide to those delegates who might attend the proposed labor congress in connection with a peace conference after the war. The statement declared that it was necessary to insert in the treaty a declaration of the economic principles which affected labor and which were involved in the war. The demands of labor should be stated and agitation begun to secure public opinion in their behalf by the time the treaty is drawn.

The résumé went into the history of the movement for uniformity in labor legislation by international agreement, and pointed out the significance of the conference at Berlin in 1890 and the Paris conference of 1900, at which latter there was organized the International Association for Labor Legislation. The association, while not an official organization, is subsidized by fourteen different Governments. The work of the international association was set forth and a brief statement made of its accomplishments in securing treaties for the prohibition of the manufacture of matches from white phosphorus,

¹ Report of proceedings of the Thirty-sixth Annual Convention of the American Federation of Labor, held at Baltimore, Md., Nov. 13 to 25, 1916. Washington, 1916. p. 55.

the prohibition to a certain extent of the nightwork of women and children, securing uniformity in certain features of social-insurance legislation, and related matters. The statement calls attention to the fact that the program of minimum demands as to legislation on these matters is not very ambitious, if nations with advanced labor legislation are considered, but to some of the workers on the Continent they would mean a very great advance indeed. Such an advance could not fail to react favorably on conditions in countries with more progressive legislation. As the proposed program of minimum demands to be submitted in connection with a peace conference had not been prepared sufficiently in advance to permit of careful examination by the delegates, discussion of them was withheld and the following resolution was adopted by the conference:

The conference of Leeds of July 5, 1916, approves the plan of organizing an international conference before negotiations for peace are begun. The date, place of assembly, and program of the congress shall be determined later, and after an understanding has been reached on these points by the syndicalistic organization interested. The program shall be limited to discussion of problems of a syndicalistic or social character.

Subsequently the conference unanimously adopted the report made by Jouhaux, of the French Confédération Générale du Travail, as to minimum legislative demands and decided to create a correspondence bureau in Paris of which Jouhaux is to be secretary general. Appleton was chosen as correspondent for Great Britain, Mahlman for Belgium, and Ambris and Calda for Italy.

COMPULSORY HEALTH INSURANCE AND NONCONTRIBUTORY OLD-AGE PENSIONS RECOMMENDED BY GOV. McCALL OF MASSACHUSETTS.¹

In his inaugural address to the members of the Massachusetts Legislature of 1917, Gov. Samuel W. McCall recommended the immediate adoption by that State of two forms of social insurance—compulsory health insurance and a system of old-age pensions. Such legislation is defined and defended by him as “the insurance of society against its diseases, and that society should take wholly or in part upon itself the work of defending against certain well-defined evils which result from our modern system of production, the chief burdens of which have heretofore been left upon deserving people who are least able to bear them.”

The need for health insurance, the governor contends, is evidenced by the fact that the health of the workingmen and their families as a group is not well looked after; that the average worker postpones

¹ From the governor's address, as printed in the Boston Evening Transcript, Jan. 4, 1917, p. 12.

consulting a physician until the very last moment, thus aggravating the illness and the cost thereof. He refers to the German health-insurance system as having improved the health and increased the average span of life of the people of that country.

He recommends that the legislature develop a plan of compulsory health insurance, but makes no specific suggestions as to its details:

I am strongly of the opinion that there is no form of social insurance that is more humane, sounder in principle, and that would confer a greater benefit upon large groups of our population and upon the Commonwealth as a whole than health insurance. System and the wholesale scale on which the enterprise would be conducted would result in procuring medical care and attendance and the benefits of preventive medicine at far less cost and with far more effect than if the workingman were acting for himself alone. It may fairly be said to involve a mobilization of the physicians of the Commonwealth for concerted effort in the most systematic and comprehensive work we have ever undertaken for the general health.

In urging the adoption of old-age pensions the governor submits an extended argument, setting forth the need of such pensions and answering several of the more frequent objections. To the claim that it is a form of charity or poor relief he replies that it should be regarded strictly as a pension "granted in recognition of long and meritorious service to society," analogous in form and similar in honor to a pension granted for service in war. To the objection that it would discourage thrift, he replies that at best the pension would be too meager (the maximum in Great Britain being \$65 per year) to have any such effect; and further, that "the members of the groups to which it would practically be applicable work for wages which would not permit of saving upon any sufficient scale, and with little to save they would have little to squander."

As to the need for old-age pensions, he believes that this is the direct creation of modern machine industry, which is conducted with such speed and strain that many workers are unable to maintain the pace much beyond their prime.

It does not necessarily mean that they are worn out, but they can not keep up with the demands of the modern methods of production, and thus they are thrown out of their accustomed work at a period of life and under circumstances when it is difficult, if not impossible, for them to acquire efficiency in a new calling. If they have not made provision before that time arrives they are likely to become dependent.

Strictly, a wage should be paid during the period in which one is ordinarily able to work in such employments which would support him for his whole life. Thirty years of labor with the fast-flying machinery of our manufacturing establishments will enable the workingman to produce more than with the appliances just before our era he could have produced in many centuries. It is not economically just to credit to machinery the whole saving in production and leave the man a derelict at the end of his working time. There should be charged against it the damage done him as a producing agency as an element in the cost of production. If that element were not to be fairly represented in

wages or in some other way we should have a deformed industrial system, which would absorb the vital forces of millions of men and then heartlessly cast them off with no hope of living out their days except through the charity of their fellow men.

It would be just to assess against production the cost of providing for the care of the worker during the period after his invalidity should come. Either that or the wage should be adjusted so that in ordinary cases it would enable the worker to make provision for himself.

The governor's recommendations for an old-age pension system are specific in form: (1) That the system should be noncontributory—i. e., that the State should bear the whole expense; (2) that the beneficiaries should be all persons 70 or more years of age who do not have children able to support them and do not have an income of more than \$200 a year, and who have been residents of the State for at least 10 years; (3) that the annuity should not exceed the maximum pension paid under the British system—i. e., \$65 a year. "It is a new field in America and can much more easily be broadened, if experience shall show that it is wise to do so, than narrowed if a false step shall have been taken."

POWER OF STATE INDUSTRIAL COMMISSION TO ISSUE ORDERS SUSTAINED BY WISCONSIN SUPREME COURT.

A decision of the Supreme Court of Wisconsin on May 2, 1916, declared unconstitutional the provision of the law of that State which undertook to confer upon the State industrial commission the power to make regulations as to the hours of labor of employed women. (*State v. Lange Canning Co.*, 157 N. W., 777.) Besides presenting the facts and conclusions in this particular case, an article in the MONTHLY REVIEW for July, 1916,¹ reviewed a number of decisions bearing on the same or related questions, and called attention in a footnote to the announced purpose of the industrial commission to secure a rehearing of the case.

No complete account of the later steps taken in the case is at hand, but a report of the proceedings of the court on the motion for rehearing appears in volume 160 of the Northwestern Reporter, page 57. From this it appears that briefs were submitted arguing the validity of the law in its provisions giving power to the commission to make regulations affecting the conditions of the employment of women, etc. This argument seems to have been advanced in an attempt to secure a rehearing of the case in which the Lange Canning Co. had been found guilty of a violation of the law limiting the hours of labor of women, in connection with which the opinion holding the

¹ See article "Court decisions on power of State industrial commissions to issue orders," in MONTHLY REVIEW for July, 1916, pp. 136-147.

grant of a rule-making power to the commission unconstitutional was rendered. The court considered the motion for a rehearing on the basis of the arguments in new briefs which were submitted, and reached the conclusion that the case should not be reopened, but announced its withdrawal of that portion of the earlier opinion which held that there had been an attempt to delegate legislative authority in contravention of the power of the legislature under the constitution. In effect, therefore, the end in view in making the motion for a rehearing was gained by the industrial commission, since its purpose was not to secure a reversal of the judgment against the Lange Canning Co., but to obtain a favorable decision as to its own power to issue orders. The opinion is brief, and is reproduced in full, the mandate mentioned at its conclusion referring to the order of the court bearing on the guilt of the defendant company:

Since the opinion in this case was filed the matter has been fully reargued by brief, and upon further study and reflection we are of the opinion that the statute may properly be construed as laying down the general rule that women shall not be permitted to work in any place for such a period of time as shall be prejudicial to their health, and authorizing the industrial commission upon investigation to determine as a fact what class or classes of employment are dangerous or prejudicial to the life, health, safety, or welfare of females, and to determine as a fact how long females may be engaged in the several classes of employment reasonably without danger or prejudice to the life, health, safety, or welfare of such females, and to establish by general orders such classification and the time which females may labor therein, so found; and we are of the opinion that as so construed and to that extent the law should be upheld, for the reason that:

"The authority thus conferred invests the commission with no arbitrary and uncontrolled discretion, but directs them to ascertain the facts and to apply the rules of law thereto under the prescribed terms and conditions. Such action is not legislative in character, but is the performance of an executive and ministerial duty within the regulations provided for in the act." (State ex rel. Butell v. Frear, 146 Wis., 305, 306; 131 N. W., 832; 34 L. R. A. (N. S.), 480.)

So much of our former opinion as is inconsistent with the views here expressed is withdrawn. We shall not attempt at this time to mark the boundaries of the commission's authority under the act as here construed, no order of the commission being before us in this action, but determination of that matter will be postponed until the action of the commission is in some way directly called in question. The modification of our views results in no modification of the mandate.

The motion for a rehearing is denied, without costs.

**CONCILIATION WORK OF THE DEPARTMENT OF LABOR,
DECEMBER 16, 1916, TO JANUARY 15, 1917.**

Under the organic act of the department, which gives the Secretary of Labor the authority to mediate in labor disputes through the appointment, in his discretion, of commissioners of conciliation, the Secretary exercised his good offices between December 16, 1916, and January 15, 1917, in three labor disputes. The companies involved, the number of employees affected, and the results secured, so far as information is available, were as follows:

**NUMBER OF LABOR DISPUTES HANDLED BY THE DEPARTMENT OF LABOR
THROUGH ITS COMMISSIONERS OF CONCILIATION, DEC. 16, 1916, TO JAN. 15, 1917.**

Name.	Workmen affected.		Result.
	Directly.	Indirectly.	
Strike of employees, Georgia Railway & Power Co., Atlanta, Ga....	437	1,030	Pending.
Strike of textile workers, Iron Works mills, Fall River, Mass.....	400	.....	Do.
Strike at King Street Terminal, Seattle, Wash.....	100	200	Adjusted. ¹

¹ Case adjusted before arrival of commissioner.

The following cases have been disposed of:

Strike of machinists, Hamilton, Ohio: Unable to adjust.

Strike of section men, C., B. & Q. R. R., St. Louis, Mo., to Burlington, Iowa: Unable to adjust.

Controversy between Missouri Pacific, St. Louis & Iron Mountain R. R. Co. and its maintenance-of-way employees, St. Louis, Mo.: Unable to adjust.

FEDERAL EMPLOYMENT WORK OF THE DEPARTMENT OF LABOR.

During November, 1916, the Division of Information of the Bureau of Immigration of the Department of Labor placed 18,822 persons in employment, as compared with 19,044 during October, 1916. Incomplete returns for December—reports from the important office in Newark, N. J., and its subbranches and from the office in St. Louis, Mo., not having been received in time to be tabulated—show a total of 16,597 persons placed during the month. The operations of the different offices throughout the country, by months, since May, 1915, when fuller reports began to be made, are contained in the statement following:

OPERATIONS OF THE DIVISION OF INFORMATION, BUREAU OF IMMIGRATION
DURING THE MONTHS OF MAY, 1915, TO DECEMBER, 1916.

Year and month.	Number of applications for help.	Number of persons applied for.	Number of applicants for places.	Number referred to employment.	Number actually employed.
1915.					
May.....	638	3,826	12,132	3,752	3,495
June.....	1,249	3,601	14,530	5,131	4,646
July.....	1,160	8,665	18,061	6,360	6,035
August.....	1,279	7,931	17,827	7,321	6,757
September.....	1,201	4,551	13,334	5,671	5,405
October.....	1,104	5,423	12,215	5,460	5,006
November.....	847	4,650	11,908	4,459	4,146
December.....	698	3,588	11,902	2,622	2,170
1916.					
January.....	933	5,063	15,015	4,300	3,419
February.....	1,423	6,413	14,257	5,036	4,185
March.....	3,443	10,209	19,484	8,113	7,030
April.....	3,805	12,104	13,498	8,843	7,653
May.....	4,918	21,326	17,614	12,938	11,453
June.....	4,826	17,402	18,824	13,839	11,960
July.....	5,488	23,657	24,058	17,608	16,309
August.....	6,420	26,791	23,720	18,062	16,313
September.....	8,312	27,185	26,276	19,643	17,169
October.....	10,552	27,985	28,504	21,789	19,044
November ¹	12,515	25,995	27,318	24,618	18,822
December.....	9,784	21,533	26,805	21,139	16,597

¹ Inclusive of activities in cooperation with State and municipal employment offices in the State of New York.

The following statement of the work of the 19 different zones covering the whole country gives details for November and December, 1916:

SUMMARY OF ACTIVITIES OF UNITED STATES EMPLOYMENT SERVICE FOR THE
MONTHS OF NOVEMBER AND DECEMBER, 1916.

Zone number and office.	Opportunities received.				Applications for employment.					
	Applications for help.		Persons applied for.		Applications received.		Referred to employment.		Number actually employed.	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
1. Boston, Mass.....		2		101	51	35	6	7	6	7
Portland, Me.....										
Total.....		2		101	51	35	6	7	6	7
2. New York, N. Y. ¹	4,641	4,881	6,141	6,756	4,420	6,257	7,280	7,563	4,449	4,798
Buffalo, N. Y. ²	1,052	1,031	3,040	2,739	1,634	2,445	2,065	2,723	1,472	2,145
Total.....	5,693	5,912	9,181	9,495	6,054	8,702	9,345	10,286	5,921	6,943
2a. Newark, N. J.....	1,469	(³)	2,505	(³)	2,572	(³)	2,180	(³)	1,610	(³)
Orange, N. J.....	220	(³)	235	(³)	110	(³)	102	(³)	85	(³)
Jersey City, N. J.....	80	(³)	511	(³)	413	(³)	341	(³)	257	(³)
Total.....	1,769	(³)	3,251	(³)	3,095	(³)	2,623	(³)	1,952	(³)
3. Philadelphia, Pa.....	114	113	530	336	295	340	286	328	223	265
Pittsburgh, Pa.....	22	18	86	1,079	865	721	466	354	402	319
Wilmington, Del.....	14	19			61	81	67	102	42	79
Total.....	150	150	616	1,415	1,221	1,142	819	784	667	663
4. Baltimore, Md.....	125	125	176	126	214	205	160	157	160	157
5. Norfolk, Va.....	10	11	243	14	170	124	92	81	45	26

¹ Inclusive of activities in cooperation with the State and municipal employment offices

² Inclusive of activities in cooperation with the State employment office.

³ Reports not received in time to be included in this table.

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SUMMARY OF ACTIVITIES OF UNITED STATES EMPLOYMENT SERVICE FOR THE MONTHS OF NOVEMBER AND DECEMBER, 1916—Concluded.

Zone number and office.	Opportunities received.				Applications for employment.					
	Applications for help.		Persons applied for.		Applications received.		Referred to employment.		Number actually employed.	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
6. Jacksonville, Fla.....					87	32	19	7	19	7
Miami, Fla.....	7	14	9	26	58	88	10	19	6	14
Savannah, Ga.....	2	4	35	30	79	46	36	32	21	20
Charleston, S. C.....	1		50		12	14	5	4	5	4
Mobile, Ala.....					6	4				
Total.....	10	18	94	56	242	184	70	62	51	45
7. New Orleans, La.....	46	55	56	225	184	295	147	237	27	52
Gulfport, Miss.....					43	59	10		9	
Memphis, Tenn.....		2		130		37				
Total.....	46	57	56	355	227	391	157	237	36	52
8. Galveston, Tex.....	9	7	110	31	24	32	14	10	6	10
Houston, Tex.....	2		2		6	23				
Amarillo, Tex.....										
Eagle Pass, Tex.....										
Albuquerque, N. Mex.....					3	3				
Total.....	11	7	112	31	33	58	14	10	6	10
9. Cleveland, Ohio.....	15	6	60	314	78	104	66	84	16	32
10. Chicago, Ill.....	448	389	2,202	2,398	2,263	2,440	2,141	2,320	2,101	2,283
Detroit, Mich.....	153	115	1,099	774	762	593	762	593	729	571
Sault Ste. Marie, Mich.....	3	8	40	295	37	60	23	41	23	41
Indianapolis, Ind.....	178	195	427	542	623	566	430	479	347	395
Total.....	782	707	3,768	4,009	3,685	3,659	3,356	3,433	3,200	3,290
11. Minneapolis, Minn....	12	11	15	24	36	47	10	18	10	18
12. St. Louis, Mo.....	270	(1)	492	(1)	384	(1)	323	(1)	298	(1)
Kansas City, Mo.....	579	374	1,495	660	1,393	799	1,744	827	1,462	815
Total.....	849	374	1,987	660	1,777	799	2,067	827	1,760	815
13. Denver, Colo.....	18	24	18	24	77	75	21	18	19	18
14. Helena, Mont.....		1		1	5	8		1		1
Moscow, Idaho.....										
Total.....		1		1	5	8		1		1
15. Seattle, Wash.....	98	102	217	183	1,586	1,776	129	118	89	91
Aberdeen, Wash.....	8	7	58	21	320	297	58	21	58	21
Bellingham, Wash.....	12	16	95	34	81	49	58	32	53	31
Colfax, Wash.....										
Everett, Wash.....	2	1	2	1	13	7	2	1	1	1
North Yakima, Wash.....	555	207	913	358	1,560	598	724	287	614	258
Spokane, Wash.....	39	25	62	42	426	225	62	35	59	34
Tacoma, Wash.....	407	427	894	1,222	1,468	2,501	1,059	1,204	1,040	1,176
Walla Walla, Wash.....	52	35	160	68	365	350	111	75	100	38
Sumner, Wash.....										
Puyallup, Wash.....										
Wenatchee, Wash.....										
Total.....	1,173	820	2,401	1,929	5,819	5,803	2,203	1,773	2,014	1,650
16. Portland, Oreg.....	962	707	1,566	1,015	2,042	2,066	1,602	1,059	1,521	1,006
Astoria, Oreg.....	43	31	126	79	452	412	130	65	122	61
Total.....	1,005	738	1,692	1,094	2,494	2,478	1,732	1,124	1,643	1,067
17. San Francisco, Cal.....	345	312	790	448	1,146	860	588	467	325	297
Reno, Nev.....	12	27	81	68	76	46	77	47	76	46
Total.....	357	339	871	516	1,222	906	665	514	401	343
18. Los Angeles, Cal.....	4	42	8	46	103	482	9	52	6	22
San Diego, Cal.....	486	439	1,446	1,257	715	1,596	1,203	1,665	909	1,432
Bakersfield, Cal.....		1		6		7		6		6
Total.....	490	482	1,454	1,309	818	2,085	1,212	1,723	915	1,460
Grand total.....	12,515	9,784	25,995	21,533	27,318	26,805	24,618	21,139	18,822	16,597

1 Reports not received in time to be included in this table.

WORK OF STATE AND MUNICIPAL EMPLOYMENT OFFICES IN THE UNITED STATES AND OF PROVINCIAL EMPLOYMENT BUREAUS IN CANADA.

In the following table data are presented for December, 1915, and December, 1916, relative to the operations of public employment offices. For the United States, figures are furnished for State employment bureaus in 15 States, municipal employment bureaus in 8 States, State-city employment bureaus in 2 States, and a city-private employment bureau in 1 State. Information is also given for 2 Canadian employment bureaus.

OPERATIONS OF PUBLIC EMPLOYMENT OFFICES, DECEMBER, 1915 AND 1916.

UNITED STATES.

State and city.	Applica- tions from em- ployers.	Persons asked for by em- ployers.	Persons applying for work.		Persons referred to posi- tions.	Positions filled.
			New registra- tions.	Renew- als.		
California (municipal):						
Berkeley—						
December, 1915.....	144	156	149	511	156	156
December, 1916.....	188	205	91	449	205	205
Fresno—						
December, 1915.....	142	348	1,012	160	369	348
December, 1916.....	187	451	792	54	481	451
Sacramento—						
December, 1915.....	169	336	75	(1)	(1)	336
December, 1916.....	180	251	78	(1)	(1)	251
California (State-city), Los Angeles ² —						
December, 1915.....	(1)	(1)	1,462	(1)	2,591	2,188
December, 1916.....	2,439	5,031	1,839	(1)	4,917	4,363
California (State):						
Oakland—						
December, 1916.....	695	865	462	380	884	700
Sacramento—						
December, 1916.....	214	641	294	231	549	489
San Francisco—						
December, 1916.....	907	1,526	1,682	473	1,618	1,121
Total:						
December, 1915.....					(1)	3,028
December, 1916.....					3 8,654	4 7,580
Colorado (State):						
Colorado Springs—						
December, 1915.....	(1)	541	(1)	(1)	(1)	504
December, 1916.....	(1)	457	392	(1)	371	(1)
Denver, No. 1—						
December, 1915.....	(1)	301	(1)	(1)	(1)	185
December, 1916.....	(1)	(1)	(1)	(1)	(1)	(1)
Denver No. 2—						
December, 1915.....	(1)	179	(1)	(1)	(1)	163
December, 1916.....	(1)	(1)	200	(1)	124	(1)
Pueblo—						
December, 1915.....	(1)	178	(1)	(1)	(1)	149
December, 1916.....	(1)	300	408	(1)	366	(1)
Total:						
December, 1915.....					(1)	1,001
December, 1916.....					5 861	(1)

¹ Not reported.

² Includes Los Angeles district, 8 counties.

³ Including figures for State employment offices which were not established until January, 1916, but not including data for Sacramento, not reported.

⁴ Including figures for State employment offices which were not established until January, 1916.

⁵ Does not include figures for Denver No. 1, not reported.

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OPERATIONS OF PUBLIC EMPLOYMENT OFFICES, DECEMBER, 1915 AND 1916—Continued.

UNITED STATES—Continued.

State and city.	Applica- tions from em- ployers.	Persons asked for by em- ployers.	Persons applying for work.		Persons referred to posi- tions.	Positions filled.
			New registra- tions.	Renew- als.		
Connecticut (State):						
Bridgeport—						
December, 1915.....	760	(1)	(1)	(1)	(1)	679
December, 1916.....	771	(1)	(1)	(1)	(1)	682
Hartford—						
December, 1915.....	466	(1)	(1)	(1)	(1)	347
December, 1916.....	778	(1)	(1)	(1)	(1)	651
New Haven—						
December, 1915.....	428	(1)	(1)	(1)	(1)	302
December, 1916.....	733	(1)	(1)	(1)	(1)	628
Norwich—						
December, 1915.....	180	(1)	(1)	(1)	(1)	171
December, 1916.....	158	(1)	(1)	(1)	(1)	151
Waterbury—						
December, 1915.....	183	(1)	(1)	(1)	(1)	110
December, 1916.....	126	(1)	(1)	(1)	(1)	84
Total:						
December, 1915.....					(1)	1,609
December, 1916.....					(1)	2,196
Illinois (municipal):						
Chicago—						
December, 1916.....	28	285	100	(1)	285	74
Indiana (State):						
Evansville—						
December, 1915.....	67	173	5		302	173
December, 1916.....	101	336	9		590	267
Fort Wayne—						
December, 1915.....	173	173	² 187	(1)	(1)	187
December, 1916.....	173	173	² 166	(1)	(1)	154
Indianapolis—						
December, 1915.....	697	697	325	275	464	464
December, 1916.....	909	909	370	290	789	789
South Bend—						
December, 1915.....	120	246	311	128	230	195
December, 1916.....	131	396	245	91	247	190
Total:						
December, 1915.....					³ 996	1,019
December, 1916.....					³ 1,626	1,400
Iowa (State):						
Des Moines—						
December, 1916.....	20	95	114	27	101	76
Kansas (State):						
Topeka—						
December, 1915.....	72	72	132	14	72	65
December, 1916.....	10	14	30	3	18	12
Kentucky (city, private):						
Louisville—						
December, 1915.....	(1)	129	347	1,186	109	60
December, 1916.....	(1)	254	354	757	266	137
Kentucky (State):						
December, 1915.....	50	50	² 210	(1)	50	50
December, 1916.....	273	273	² 411	(1)	273	273
Total:						
December, 1915.....					159	110
December, 1916.....					539	410

¹ Not reported.² Number applying for work.³ Exclusive of figures for Fort Wayne, not reported.

OPERATIONS OF PUBLIC EMPLOYMENT OFFICES, DECEMBER, 1915 AND 1916—Continued.

UNITED STATES—Continued.

State and city.	Applica- tions from em- ployers.	Persons asked for by em- ployers.	Persons applying for work.		Persons referred to posi- tions.	Positions filled.
			New registra- tions.	Renew- als.		
Massachusetts (State):						
Boston—						
December, 1915.....	1,402	1,695	1 935	(2)	2 2,672	1,267
December, 1916.....	1,430	1,649	1 982	(2)	2 2,499	1,117
Fall River—						
December, 1915.....	107	111	1 18	(2)	2 94	83
December, 1916.....	137	139	1 14	(2)	2 130	114
Springfield—						
December, 1915.....	620	786	1 145	(2)	2 869	624
December, 1916.....	862	1,187	1 354	(2)	2 1,256	801
Worcester—						
December, 1915.....	594	720	1 421	(2)	2 983	515
December, 1916.....	829	1,127	1 502	(2)	2 1,242	657
Total:						
December, 1915.....					2 4,618	2,489
December, 1916.....					2 5,127	2,689
Michigan (State):						
Battle Creek—						
December, 1916.....	42	154	4 106	(2)	104	104
Bay City—						
December, 1916.....	58	123	4 221	(2)	123	123
Detroit—						
December, 1915.....	(2)	2,772	(2)	(2)	2,772	2,772
December, 1916.....	450	3,175	(2)	(2)	3,175	3,175
Flint—						
December, 1915.....	(2)	424	(2)	(2)	424	424
December, 1916.....	748	748	4 748	(2)	748	748
Grand Rapids—						
December, 1915.....	(2)	632	(2)	(2)	632	632
December, 1916.....	337	586	4 586	(2)	565	565
Jackson—						
December, 1915.....	(2)	483	(2)	(2)	483	483
December, 1916.....	302	511	(2)	(2)	499	486
Kalamazoo—						
December, 1915.....	(2)	286	(2)	(2)	286	286
December, 1916.....	243	243	4 243	(2)	243	243
Lansing—						
December, 1916.....	25	81	4 104	(2)	66	66
Muskegon—						
December, 1916.....	48	132	4 170	(2)	131	106
Saginaw—						
December, 1915.....	(2)	603	(2)	(2)	603	603
December, 1916.....	127	641	4 552	(2)	552	552
Total:						
December, 1915.....					2 5,200	5,200
December, 1916.....					2 6,206	6,168
Minnesota (State):						
Duluth—						
December, 1915.....	(2)	(2)	(2)	(2)	(2)	618
December, 1916.....	(2)	(2)	(2)	(2)	(2)	1,105
Minneapolis—						
December, 1915.....	(2)	(2)	(2)	(2)	(2)	1,211
December, 1916.....	(2)	(2)	(2)	(2)	(2)	1,951
St. Paul—						
December, 1915.....	(2)	(2)	(2)	(2)	(2)	756
December, 1916.....	(2)	(2)	(2)	(2)	(2)	1,118
Total:						
December, 1915.....					(2)	2,585
December, 1916.....					(2)	4,174
Montana (municipal):						
Butte—						
December, 1915.....	405	(2)	4 685	(2)	405	330
December, 1916.....	373	(2)	4 485	(2)	(2)	283

1 Number who were registered.

2 Not reported.

3 Number of offers of positions.

4 Number applying for work.

5 Exclusive of figures for offices at Battle Creek, Bay City, Lansing, and Muskegon, opened since December, 1915.

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OPERATIONS OF PUBLIC EMPLOYMENT OFFICES DECEMBER, 1915 AND 1916—Continued.

UNITED STATES—Continued.

State and city.	Applica- tions from em- ployers.	Persons asked for by em- ployers.	Persons applying for work.		Persons referred to posi- tions.	Positions filled.
			New registra- tions.	Renew- als.		
New York (municipal):						
New York City—						
December, 1915.....	757	903	1,676	(1)	1,188	737
December, 1916.....	2,375	2,750	1,856	(1)	3,558	2,340
New York (State):						
Albany—						
December, 1915.....	278	416	547	229	571	312
December, 1916.....	413	565	415	285	734	424
Brooklyn—						
December, 1915.....	782	1,410	1,337	502	1,506	787
December, 1916.....	1,381	1,895	946	507	2,049	1,296
Buffalo—						
December, 1915.....	440	710	679	219	836	539
December, 1916.....	923	1,922	1,459	89	1,882	1,428
Rochester—						
December, 1915.....	562	894	644	269	989	604
December, 1916.....	1,062	1,744	815	373	1,548	870
Syracuse—						
December, 1915.....	443	572	501	147	596	442
December, 1916.....	789	1,206	672	96	1,065	745
Total:						
December, 1915.....					5,686	3,421
December, 1916.....					10,836	7,103
Ohio (State-city):						
Akron—						
December, 1915.....	(1)	1,179	836	2,268	1,100	890
December, 1916.....	(1)	1,674	717	1,636	1,411	1,184
Cincinnati—						
December, 1915.....	(1)	1,112	1,704	3,476	1,041	780
December, 1916.....	(1)	1,621	1,676	2,589	1,670	1,118
Cleveland—						
December, 1915.....	(1)	5,231	2,448	6,569	3,940	3,277
December, 1916.....	(1)	6,815	2,306	6,840	5,780	4,536
Columbus—						
December, 1915.....	(1)	1,476	802	2,697	1,447	1,227
December, 1916.....	(1)	1,854	578	2,170	1,769	1,516
Dayton—						
December, 1915.....	(1)	946	721	1,352	823	754
December, 1916.....	(1)	914	677	1,069	849	751
Toledo—						
December, 1915.....	(1)	1,887	1,402	2,849	1,871	1,652
December, 1916.....	(1)	1,990	1,286	2,354	1,804	1,486
Youngstown—						
December, 1915.....	(1)	1,375	771	1,388	1,043	815
December, 1916.....	(1)	1,005	601	740	968	843
Total:						
December, 1915.....					11,265	9,395
December, 1916.....					14,251	11,434
Oklahoma (State):						
Enid—						
December, 1915.....	(1)	76	2 112	(1)	(1)	68
December, 1916.....	(1)	86	116	(1)	(1)	78
Muskogee—						
December, 1915.....	(1)	222	2 170	(1)	(1)	143
December, 1916.....	(1)	337	236	(1)	(1)	211
Oklahoma City—						
December, 1915.....	(1)	243	2 303	(1)	(1)	196
December, 1916.....	(1)	341	364	(1)	(1)	289
Tulsa—						
December, 1915.....	(1)	238	2 217	(1)	(1)	209
December, 1916.....	(1)	740	707	(1)	(1)	667
Total:						
December, 1915.....					(1)	616
December, 1916.....					(1)	1,245
Oregon (municipal):						
Portland—						
December, 1915.....	211	543	1,605	(1)	(1)	526
December, 1916.....	502	807	900	(1)	(1)	792

¹ Not reported.² Number applying for work.

OPERATIONS OF PUBLIC EMPLOYMENT OFFICES, DECEMBER, 1915 AND 1916—Continued.

UNITED STATES—Concluded.

State and city.	Applica- tions from em- ployers.	Persons asked for by em- ployers.	Persons applying for work.		Persons referred to posi- tions.	Positions filled.
			New registra- tions.	Renew- als.		
Pennsylvania (State):						
Altoona—						
December, 1916.....	(1)	142	47	6	79	69
Harrisburg—						
December, 1916.....	(1)	254	238	79	198	169
Johnstown—						
December, 1916.....	(1)	214	71	24	81	70
Philadelphia—						
December, 1916.....	(1)	881	600	539	958	774
Pittsburgh—						
December, 1916.....	(1)	1,052	513	206	542	508
Total:						
December, 1916.....					1,858	1,590
Rhode Island (State):						
Providence—						
December, 1915.....	181	209	360	26	209	209
December, 1916.....	120	129	51	34	(1)	129
Texas (municipal):						
Dallas—						
December, 1915.....	96	132	80	16	190	132
December, 1916.....	155	290	85	11	305	268
Fort Worth—						
December, 1915.....	129	167	2,288	(1)	162	151
December, 1916.....	225	326	645	27	209	203
Total:						
December, 1915.....					352	283
December, 1916.....					514	471
Virginia (municipal):						
Richmond—						
December, 1915.....	211	643	542	(1)	362	175
December, 1916.....	223	335	241	(1)	403	192
Washington (Federal-municipal):						
Tacoma. ³						
Washington (municipal):						
Everett—						
December, 1915.....	(1)	(1)	(1)	(1)	(1)	101
December, 1916.....	(1)	(1)	(1)	(1)	(1)	267
Seattle—						
December, 1915.....	1,432	2,043	(1)	(1)	2,124	1,858
December, 1916.....	2,253	3,324	(1)	(1)	3,295	3,010
Spokane—						
December, 1916.....	1,610	1,875	106		1,856	1,856
Total:						
December, 1915.....					(1)	⁴ 1,959
December, 1916.....					(1)	5,133
Wisconsin (State):						
La Crosse—						
December, 1915.....	112	158	(1)	(1)	149	76
December, 1916.....	87	125	² 204	(1)	84	74
Milwaukee—						
December, 1915.....	1,158	2,006	(1)	(1)	1,986	1,712
December, 1916.....	1,300	2,968	² 2,829	(1)	2,913	2,211
Oshkosh—						
December, 1915.....	92	113	(1)	(1)	108	99
December, 1916.....	109	127	² 191	(1)	103	80
Superior—						
December, 1915.....	241	283	(1)	(1)	346	279
December, 1916.....	249	928	² 546	(1)	542	438
Total:						
December, 1915.....					2,589	2,166
December, 1916.....					3,642	2,803

¹ Not reported.² Number applying for work.³ Figures for this office are carried regularly in the REVIEW under the subject "Federal employment work of the Department of Labor," to which the reader is referred.⁴ Not including figures for Spokane, not reported.

OPERATIONS OF PUBLIC EMPLOYMENT OFFICES, DECEMBER, 1915 AND 1916—Concluded.

DOMINION OF CANADA.

Province and city.	Applica- tions from em- ployers.	Persons asked for by em- ployers.	Persons applying for work.		Persons referred to posi- tions.	Positions filled.
			New registra- tions.	Renew- als.		
Quebec (Province):						
Montreal—						
December, 1916.....	182	394	348	(1)	339	266
Quebec—						
December, 1915.....	(1)	41	2 177	(1)	(1)	47
December, 1916.....	(1)	44	2 74	(1)	(1)	28
Total:						
December, 1915.....					(1)	(1)
December, 1916.....					(1)	294

¹ Not reported.² Number applying for work.

EMPLOYMENT IN SELECTED INDUSTRIES, DECEMBER, 1916.

Figures indicating the change in the volume of employment in representative manufacturing establishments in the United States in December, 1916, as compared with the same month in the preceding year, show that in 10 of the 13 industries covered by the bureau the number of employees on the pay roll was greater in December, 1916, than in December, 1915. The greatest increase shown (25 per cent) is in automobile manufacturing, while the three industries showing a decrease are boots and shoes, cotton manufacturing, and cigar manufacturing. The figures in the last-named industry are somewhat affected by a strike occurring in December, 1916, reported by one establishment. The amount of money paid to employees was greater in all of the 13 industries in December, 1916, than in December, 1915. The greatest increase reported is 42.6 per cent for the iron and steel industry.

COMPARISON OF EMPLOYMENT IN IDENTICAL ESTABLISHMENTS IN DECEMBER, 1915, AND DECEMBER, 1916.

Industry.	Estab- lish- ments to which inqui- ries were sent.	Estab- lish- ments report- ing for Decem- ber both years.	Period of pay roll.	Number on pay roll in December—		Per cent of increase (+) or de- crease (-).	Amount of pay roll in December—		Per cent of increase (+) or de- crease (-).
				1915	1916		1915	1916	
Boots and shoes.....	85	72	1 week..	65,853	64,596	- 1.9	788,494	952,775	+20.8
Cotton manufacturing..	89	50	do.....	51,863	51,740	- .2	436,342	544,507	+24.8
Cotton finishing.....	19	16	do.....	12,326	12,794	+ 3.8	139,039	175,759	+26.4
Hosiery and underwear	82	53	do.....	30,347	31,624	+ 4.2	283,027	335,954	+18.7
Woolen.....	56	43	do.....	39,548	40,261	+ 1.8	409,310	534,682	+30.6
Silk.....	64	48	2 weeks..	15,997	16,206	+ 1.3	329,701	368,601	+11.8
Men's ready-made clothing.....	88	37	1 week..	22,744	25,925	+14.0	301,034	381,847	+26.8
Iron and steel.....	142	95	1/2 month.	132,951	162,709	+22.4	4,597,075	6,554,472	+42.6
Car building and re- pairing.....	79	29	do.....	39,457	42,213	+ 7.0	1,208,867	1,408,767	+16.5
Cigar manufacturing...	105	57	1 week..	21,947	19,805	- 9.8	226,806	238,463	+ 5.1
Automobile manufac- turing.....	73	32	do.....	54,030	67,529	+25.0	947,237	1,276,705	+34.8
Leather manufacturing	45	26	do.....	11,754	13,458	+14.5	149,650	205,437	+37.3
Paper making.....	70	45	do.....	18,210	21,606	+18.6	234,655	326,206	+39.0

Reports were also received from a very much smaller number of establishments as to the number of employees actually working on the last full day of the reported pay period. The comparable figures for December, 1916, and December, 1915, appear in the following table. In considering the figures the number of establishments covered should be noted. All industries are shown, although some of them are poorly reported.

COMPARISON OF EMPLOYMENT IN IDENTICAL ESTABLISHMENTS ON LAST FULL DAY'S OPERATION IN DECEMBER, 1915, AND DECEMBER, 1916.

Industry.	Establishments reporting for December, both years.	Period of pay roll.	Number actually working on last full day of reported pay period in December—		Per cent of increase (+) or decrease (-).
			1915	1916	
Boots and shoes.....	11	1 week..	5,345	5,855	+ 9.5
Cotton manufacturing.....	27	do.....	21,314	21,800	+ 2.3
Cotton finishing.....	12	do.....	10,255	10,569	+ 3.1
Hosiery and underwear.....	9	do.....	9,378	10,003	+ 7.0
Woolen.....	35	do.....	32,183	32,765	+ 1.8
Silk.....	18	2 weeks..	6,194	6,374	+ 2.9
Men's ready-made clothing.....	7	1 week..	7,467	8,779	+17.6
Iron and steel.....	86	½ month..	112,105	134,922	+20.4
Car building and repairing.....	25	do.....	32,182	34,618	+ 7.6
Cigar manufacturing.....	23	1 week..	6,831	5,773	-15.5
Automobile manufacturing.....	16	do.....	23,024	31,436	+36.5
Leather manufacturing.....	14	do.....	8,660	9,970	+15.1
Paper making.....	11	do.....	5,487	6,677	+21.7

Reports from 6 clothing establishments show \$13,409 paid for contract work in December, 1916, as against \$12,590 in December, 1915.

The figures of the next table show that in all of the 13 industries listed the number of employees on the pay roll was greater in December, 1916, than in November, 1916. The figures in cigar manufacturing are influenced by strikes reported by four establishments as occurring in November, 1916, and by one establishment as occurring in December, 1916. More money was paid to employees in all of the industries in the table in December, 1916, than in November, 1916. The greatest increase reported is 11 per cent in cotton finishing. In this table is presented for the first time a comparison of a month of 1916 with the preceding month for automobiles, leather, and paper.

COMPARISON OF EMPLOYMENT IN IDENTICAL ESTABLISHMENTS IN NOVEMBER 1916, AND DECEMBER, 1916.

Industry.	Estab-lish-ments to which inquir-ies were sent.	Estab-lish-ments reporting for Novem-ber and Decem-ber.	Period of pay roll.	Number on pay roll in—		Per cent of in-crease (+) or de-crease (-).	Amount of pay roll in—		Per cent of in-crease (+) or de-crease (-).
				Novem-ber, 1916.	Decem-ber, 1916.		Novem-ber, 1916.	Decem-ber, 1916.	
Boots and shoes.....	85	68	1 week..	59,703	62,513	+4.7	835,827	923,676	+10.5
Cotton manufacturing.....	89	48	...do.....	52,112	52,873	+1.5	524,376	560,505	+6.9
Cotton finishing.....	19	17	...do.....	14,356	14,712	+2.5	181,614	201,673	+11.0
Hosiery and underwear.....	82	52	...do.....	29,977	30,310	+1.1	305,599	320,125	+4.8
Woolen.....	56	44	...do.....	39,020	39,666	+1.7	477,472	525,285	+10.0
Silk.....	64	47	2 weeks..	15,693	15,906	+1.4	348,281	362,396	+4.1
Men's ready-made clothing.....	88	37	1 week..	23,151	24,455	+5.6	335,739	364,014	+8.4
Iron and steel.....	142	93	½ month..	138,221	139,623	+1.0	5,449,506	5,692,981	+4.5
Car building and re- pairing.....	79	27	...do.....	40,826	41,280	+1.1	1,341,125	1,377,319	+2.7
Cigar manufacturing.....	105	57	1 week..	18,774	19,942	+6.2	218,833	239,752	+9.6
Automobile manufac- turing.....	73	24	...do.....	49,421	51,703	+4.6	984,553	1,005,268	+2.1
Leather manufactur- ing.....	45	24	...do.....	12,056	12,709	+5.4	176,271	192,269	+9.1
Paper making.....	70	36	...do.....	12,991	13,493	+3.9	198,549	209,977	+5.8

The next table gives in comparable form for 13 industries the number of employees reported as actually working on the last full day of the reported pay period in December, 1916, and November, 1916. The number of establishments reporting this item is much smaller than the number of establishments reporting in the immediately preceding table, which fact must be taken into consideration in using these figures. The figures are given, however, for all industries included in the inquiry.

COMPARISON OF EMPLOYMENT IN IDENTICAL ESTABLISHMENTS ON LAST FULL DAY'S OPERATION IN NOVEMBER, 1916, AND DECEMBER, 1916.

Industry.	Estab-lish-ments reporting for Novem-ber and Decem-ber.	Period of pay roll.	Number actually working on last full day of reported pay period in—		Per cent of in-crease (+) or de-crease (-).
			Novem-ber, 1916.	Decem-ber, 1916.	
Boots and shoes.....	12	1 week..	6,707	6,921	+3.2
Cotton manufacturing.....	30	...do.....	24,303	24,258	— .2
Cotton finishing.....	13	...do.....	10,183	10,366	+1.8
Hosiery and underwear.....	10	...do.....	10,339	10,435	+ .9
Woolen.....	34	...do.....	27,679	28,244	+2.0
Silk.....	24	2 weeks..	9,004	9,167	+1.8
Men's ready-made clothing.....	8	1 week..	10,986	11,619	+5.8
Iron and steel.....	84	½ month..	112,577	114,444	+1.7
Car building and repairing.....	24	...do.....	34,502	35,289	+2.3
Cigar manufacturing.....	17	1 week..	3,580	4,245	+18.6
Automobile manufacturing.....	11	...do.....	28,041	29,290	+4.5
Leather manufacturing.....	12	...do.....	8,920	9,232	+3.5
Paper making.....	8	...do.....	3,720	3,639	-2.2

Reports from 3 clothing establishments show \$6,450 paid for contract work in December, 1916, as against \$5,600 in November, 1916. While the bureau is making an effort to get complete returns on this

item, reports are not made by many establishments. Reports from all establishments would make this item of material value to the clothing industry.

CHANGES IN WAGE RATES.

The changes in wage rates reported to this bureau as occurring in 13 industries in the month November 15 to December 15, 1916, are here presented in summary form. Many establishments failed to answer the inquiry as to wage-rate changes during the month, and in such cases it is probably safe to assume that no changes were made.

The greatest number of changes took place in the textile industries, cotton manufacturing, cotton finishing, silk, and woolen. The increases during the month reported in these industries, in many cases, follow other increases made earlier in the calendar year 1916, and as a result the wage rates in the textile industries are now at a high level. In cotton manufacturing an increase of 5 per cent is reported during the month by three establishments. In one case the advanced rate applied to all employees, in another to all but the office force, while in the third case the proportion receiving the advance is not stated. One establishment reports an increase of about 8 per cent to all employees. An increase of 10 per cent is reported by 18 establishments. In 13 of the 18 plants the advance was given to all employees; in two cases it was given approximately all, and in another case to 90 per cent of the force. In two establishments the proportion of the force receiving the 10 per cent increase is not stated. The above increases are not confined to any one section of the country.

In cotton finishing an increase of 10 per cent is reported by 7 establishments. In four instances, the advance applied to all. In one case the advanced rate was given to all but foremen; in another case to about 85 per cent of the force, and in a third establishment to 95 per cent of the employees.

In the silk industry increases are reported by four establishments. A 5 per cent increase on the pay of a specified date was given in one case to an unreported proportion of the force; a 7 per cent advance to 90 per cent of the force is reported by another establishment, while two others report increases of 10 per cent, in one instance the increase being made general, and in the other made to apply only in some departments.

In the woolen industry an increase of 10 per cent is reported by 37 establishments. In 35 plants the advanced rate is reported as being given to all. In one establishment it was given to approximately all and in another establishment the proportion receiving the advance is not stated.

In the iron and steel industry one establishment reports an increase of 7 per cent, but does not state the proportion of the force receiving

the same. An increase of 10 per cent to all employees is reported by two establishments; another applies the same rate of increase to the office force, while still another makes the same rate of increase apply to all but salaried people. One establishment gave a 10 per cent increase, but does not state the proportion of the force receiving the advance. In one blast furnace the entire force received an increase of 15 cents a day for 10-hour men and 25 cents a day for 12-hour men.

In the manufacture of boots and shoes a "bonus" of 10 per cent is reported by several plants extending to a large proportion of the force. From the term used, this extra money evidently is not intended as a permanent wage-rate increase. One establishment reports an increase on day labor and in "numerous lines throughout the factory," the rate of advance being given as 10 to 12 per cent. Another establishment reports an increase in piecework prices, rate not stated.

In the hosiery and underwear industry one establishment reports a 5 per cent "bonus" to all; one establishment gave a 5 per cent increase to all; another gave an increase of $7\frac{1}{2}$ per cent to about two-thirds of the force; still another made the increase 8 per cent to 92 per cent of the force, while three establishments gave a 10 per cent increase to all employees.

In leather manufacture an increase of from 5 to 15 per cent to about 80 per cent of the force is reported by one establishment; another establishment reports an increase of 10 per cent to about 90 per cent of the force, while a third concern reports a 10 per cent increase to practically all employees.

In cigar manufacturing an increase of 12 per cent to 65 per cent of the force is reported by one establishment, an increase of 18 per cent to 94 per cent of the force by one establishment, and an increase of 20 per cent to 4 per cent of the force by a third establishment.

The only change reported in the industry of automobile manufacturing is an increase in one establishment of 1.54 cents in the productive average hourly rate. In car building and repairing only two increases are reported. One establishment reports an increase of 3 per cent to all, while another reports an increase of 2 cents per hour to 95 per cent of the force.

In the men's ready-made-clothing industry only one establishment reports a change, a 2 per cent advance to pieceworkers, with a reduction of working hours from 50 to 48.

In the manufacture of paper one establishment reports an increase of 7 per cent to all employees. An increase of 10 per cent, in the nature of a "temporary" increase, or "temporary emergency" increase, as it is also described, is reported by three establishments. One establishment reports a "bonus" of 10 per cent on November wages. One establishment reports a 10 per cent increase to day workers and a change of four workers from two 12-hour shifts to

three 8-hour shifts. In another establishment it is reported that there were increases made affecting the entire force.

INDEX NUMBERS FOR 1915 AND 1916.

The inquiry concerning volume of employment has been carried on by the bureau for more than a year. As figures have been gathered month by month during 1916, corresponding information for the same month in the preceding year has been obtained, and data are now available for seven industries for each month from January, 1915, to December, 1916. In order to show the variations in numbers employed and wages paid from month to month, index numbers or percentages have been computed from the data available, the figures for January, 1916, being taken as the base, or 100 per cent. January, 1916, rather than January, 1915, is taken as the base, because the facts for other industries will be available later, from January, 1916, down, but will not be available as far back as January, 1915, and it is deemed advisable to have the figures for all industries on the same base when later they are brought together.

The index numbers for 1916 are computed on the per cent of change from month to month during the year. From the index numbers for 1916 and the per cent of change between each month and the corresponding month of 1915 the index numbers for 1915 have been determined.

INDEX NUMBERS OF VOLUME OF EMPLOYMENT, 1915 AND 1916.

[January, 1916=100.]

Month and year.	Boots and shoes.		Cotton manufacturing.		Cotton finishing.		Woolen manufacturing.		Hosiery and underwear.		Silk.		Iron and steel.	
	Number on pay roll.	Amt. of pay roll.	Number on pay roll.	Amt. of pay roll.	Number on pay roll.	Amt. of pay roll.	Number on pay roll.	Amt. of pay roll.	Number on pay roll.	Amt. of pay roll.	Number on pay roll.	Amt. of pay roll.	Number on pay roll.	Amt. of pay roll.
1915.														
January.....	88	80	101	98	85	81	88	81	87	76	91	83	74	62
February.....	87	77	101	103	94	90	88	80	91	81	93	90	71	66
March.....	83	71	103	105	91	89	91	84	91	85	93	92	77	72
April.....	78	61	102	103	93	92	93	88	94	85	90	85	80	75
May.....	79	66	103	104	93	93	94	86	96	90	91	88	82	74
June.....	80	71	102	100	87	86	89	79	98	93	90	85	85	81
July.....	81	73	103	99	92	85	92	79	96	90	89	86	87	75
August.....	82	76	101	100	90	88	90	78	94	89	91	87	90	83
September.....	82	76	101	101	90	87	99	90	98	89	92	87	93	87
October.....	90	89	102	94	94	92	99	82	100	98	94	94	97	91
November.....	94	97	103	99	104	94	102	94	101	100	97	101	97	98
December.....	109	104	102	98	97	100	103	98	104	105	98	100	97	101
1916.														
January.....	100	100	100	100	100	100	100	100	100	100	100	100	100	100
February.....	100	99	101	108	101	105	102	108	101	105	97	105	102	113
March.....	101	101	101	110	103	107	102	109	103	108	100	109	105	115
April.....	99	97	101	111	98	103	104	110	104	108	101	108	104	115
May.....	98	99	101	116	95	110	105	118	105	111	100	108	108	126
June.....	99	102	102	115	96	111	103	112	105	110	100	111	109	128
July.....	100	101	102	112	96	107	101	110	104	103	101	100	111	111
August.....	99	98	100	112	97	107	97	104	102	102	100	104	113	125
September.....	98	98	100	114	96	109	101	111	104	108	99	104	115	130
October.....	98	99	100	110	96	110	102	108	106	112	100	109	115	135
November.....	102	113	101	115	99	114	103	116	107	119	98	108	117	138
December.....	107	125	102	123	101	126	105	128	108	124	100	112	118	144

The index number shows the relative variation in the actual figures. To illustrate the use of the figures, the amount of the pay roll in the boot and shoe industry is taken. The index number in January, 1915, is 80, indicating that the pay roll for that month was 80 per cent of the pay roll in January, 1916; while in December, 1916, the amount of the pay roll was 125 per cent of the pay roll in January, 1916. The increase in December, 1916, was 45 points over the index 80 in January, 1915, which number, 45, is 56 per cent of 80, making the per cent of increase in the boot and shoe pay roll between January, 1915, and December, 1916, 56 per cent.

In numbers of employees, six out of seven industries covered by this table show material increases in December, 1916, over January, 1915. The increases are: Boots and shoes, 22 per cent; cotton manufacturing, 1 per cent; cotton finishing, 19 per cent; woolen manufacturing, 19 per cent; hosiery and underwear, 24 per cent; silk, 10 per cent; iron and steel, 59 per cent.

In the amount of the pay rolls all seven industries show a marked increase in December, 1916, over January, 1915. The greatest increase is for the iron and steel industry, 132 per cent, and the lowest increase was 26 per cent in cotton manufacturing. The increases for the other industries were boots and shoes, 56 per cent; cotton finishing, 56 per cent; woolen, 58 per cent; hosiery and underwear, 63 per cent; and silk, 35 per cent.

EMPLOYMENT IN THE STATE OF NEW YORK IN DECEMBER, 1916.

A statement issued by the New York State department of labor reads as follows:

EMPLOYMENT IN FACTORIES.

[Reported by 1,500 representative firms with over a half million employees, or one-third of the factory workers in the State, and a weekly pay roll of more than \$8,000,000.]

The increasing activity in manufacturing in New York State which has been manifest for the last two years was again displayed in the closing month of the year 1916. In December a larger number of workers were employed and more wages were paid than in any other month in which returns have been received, dating back to June, 1914. Six of the industrial groups established new high records both in number of workers and in amount of wages paid. From November to December, while the increase in number of employees was nominal, the aggregate of wages increased 3 per cent. Eight of the industrial groups had more employees and seven paid out more wages than in November. Only two groups reported

decreases in both employees and wages, the decrease amounting to 2 per cent in each case.

As compared with December of each of the last two years, more workers were employed and more wages were paid in each of the groups. The increase over December, 1915, was 12 per cent in number of employees and 29 per cent in amount of wages. As compared with December, 1914, the increases were 31 and 62 per cent respectively.

The average earnings for a week of the total number of employees reporting in December, 1916, were \$15.53 as compared with \$15.17 for a week in the previous month. The average earnings for a week in December, 1915, were \$13.49 and in December, 1914, \$12.56.

The *stone, clay, and glass product* group reported in December a 3 per cent increase over November in both employees and wages, a new high record in both respects. Each of the industries reported increases except the manufacture of brick, which experienced the usual decline at this season of the year. As compared with December of last year, there were one-sixth more employees in the group as a whole and one-third more wages were paid.

The *metals, machinery, and conveyances* group established a new high record in number of employees and in amount of wages paid. The increase over November was 1 per cent in the former and 4 per cent in the latter. Ten of the twelve industries in the group reported increased activity. As compared with December, 1915, the group as a whole employed one-fifth more workers and paid out two-fifths more wages.

The *wood manufactures* group maintained the high level set the previous month. There was an increase of less than 1 per cent in number of employees and a decrease of less than 1 per cent in amount of wages paid. There was a seasonal curtailment of output in saw-mills and planing mills. The other industries in the group, pianos especially, reported increased activity. As compared with December, 1915, there were in the group as a whole one-thirteenth more employees and one-fifth more wages were paid.

The *furs, leather, and rubber goods* group reached a new high level of activity in December. As compared with November there was an increase of 1 per cent in the number of workers and of 3 per cent in the aggregate of wages. The manufacture of footwear, which is much the largest industry in this group, was chiefly responsible for the increased activity. Tanneries likewise reported a marked increase in both wages and employees. More wages were paid in the rubber goods and gutta-percha products industry. Fur manufacturers reported a smaller volume of wages, although the number of workers was somewhat larger. Activity in the miscellaneous leather and canvas goods industry was noticeably lessened. As compared

with December one year ago, the group as a whole employed one-tenth more workers and paid out one-fourth more wages.

The *chemicals* group employed in December 3 per cent more workers and paid out 9 per cent more wages than in November, thereby establishing a new high record for the group in both respects. Each industry reported increases in both employees and wages over November, the increase in wages exceeding that in employees in each instance. Both overtime and increases in rates of wages operated to produce this result. The group as a whole had one-eighth more workers and paid out one-third more wages than in December of last year.

The *paper* industry employed 3 per cent fewer workers in December than in November, but paid out slightly more wages, thereby establishing a new high record in the latter respect. As compared with December, 1915, the industry had one-fifth more employees and paid out two-fifths more wages.

The *printing and paper goods* group attained a pitch of activity in December greater than any hitherto reported. Employees were 2 per cent more in number and the aggregate of wages paid was 3 per cent greater than in November. As compared with December of last year, the group employed one-twentieth more workers and paid out one-tenth more wages.

The *textiles* group employed more workers and paid out more wages in December than in any other month for which returns have been received. The increase over November was 1 per cent in employees and 4 per cent in wages. Each of the industries, except wool manufactures, in the group increased the number of employees and each industry, except silk and silk goods, paid out more wages. There were a number of increases of rates of wages in the wool manufactures and cotton manufactures industries. As compared with December, 1915, there were one-twentieth more workers in the group as a whole and one-fifth more wages were paid.

The *clothing, millinery, and laundering* group in December employed 2 per cent fewer workers and paid out 2 per cent less in wages than in the preceding month. Strikes in New York City reduced the output of men's clothing. Men's shirts and furnishings reported increased activity. Millinery displayed much greater strength than in November and miscellaneous sewing almost as much weakness. Women's clothing reported somewhat lessened activity. The group as a whole employed 3 per cent more workers and paid out 14 per cent more wages than in December of last year.

The *food, liquors, and tobacco* group employed 3 per cent fewer workers and paid out 2 per cent less wages in December than in November. The canning and preserving industry experienced a seasonal decline. Sugar refineries reported much less activity. Flour

and cereal products and slaughtering were more active. The amount of wages paid in the tobacco products industry equalled for the first time in two and one-half years the amount paid in June, 1914. The group as a whole employed 3 per cent more workers and paid out 15 per cent more wages than in December, 1915.

The *water, light, and power* industry reported in December 7 per cent more employees and 3 per cent less wages than in November. As compared with December, 1915, there were one-tenth more employees and one-eighth more wages paid.

BUILDING ACTIVITY IN PRINCIPAL CITIES.

[Reported by building departments.]

Building activity in the 10 cities of the first and second class in New York State was 9 per cent greater in December than in November and 11 per cent less than in December one year ago. These figures are based on returns received from the building departments of these cities as to the estimated cost of building work, of which new buildings constituted 80 per cent, for which permits were issued. As compared with November only four cities—Buffalo, New York, Rochester, and Troy—reported increases, but the increase in the Borough of Manhattan was large enough to more than offset losses in other cities. As compared with December, 1915, Buffalo, Schenectady, Troy, and Utica reported increases, while the other six cities reported decreases.

EMPLOYMENT AND WAGES IN OHIO IN 1915.

A statement recently given to the press summarizes the results of a very comprehensive investigation of the Industrial Commission of Ohio regarding wages and employment in that State during 1915. All industries, except interstate railroading and mining, are covered, and the number of employees for whom information was obtained—some 900,000—constitutes an extremely large proportion of the total employees of the State.

Of the data presented in the report particular interest attaches to the tabulations showing for some 18,000 establishments the number of persons employed on the 15th day of each month of the year 1915. From January to December the number of employees increased from 641,274 to 808,729. This difference of 167,455 constitutes a variation of 20.7 per cent from the December maximum. The following table shows in detail the variation in number of workers, by sex and their broad occupational groups—wage earners, salaried office workers, and salaried sales people.

NUMBER OF WORKERS OF EACH OCCUPATION GROUP EMPLOYED IN OHIO ON
THE 15TH OF EACH MONTH DURING 1915.

Occupation group and sex.	Number of establishments reporting.	Number reported as employed on the 15th of—					
		Jan.	Feb.	Mar.	Apr.	May.	June.
All employees.....	17,981	641,274	655,143	681,989	708,833	726,387	744,954
Wage earners.....		546,163	560,725	585,972	611,992	628,613	646,787
Males.....		454,834	466,528	489,457	516,030	533,553	551,195
Females.....		91,329	94,197	96,515	95,962	95,060	95,592
Bookkeepers, stenographers, and office clerks.....		63,926	63,973	64,608	64,917	65,523	66,506
Males.....		37,284	37,274	37,644	37,852	38,299	39,009
Females.....		26,642	26,699	26,964	27,065	27,224	27,497
Sales people (not traveling).....		31,185	30,445	31,409	31,924	32,251	31,661
Males.....		16,254	16,108	16,201	16,458	16,528	16,613
Females.....		14,931	14,337	15,208	15,466	15,723	15,048

Occupation group and sex.	Number reported as employed on the 15th of—						Variation from maximum.	
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Number.	Per cent.
All employees.....	749,952	760,394	785,170	788,190	793,256	808,729	167,455	29.7
Wage earners.....	652,116	662,590	685,425	686,976	690,686	701,081	154,918	22.1
Males.....	557,476	566,279	585,486	584,909	588,993	598,681	143,847	24.0
Females.....	94,640	96,311	99,939	102,067	101,693	102,400	11,071	10.8
Bookkeepers, stenographers, and office clerks.....	66,836	67,314	67,913	68,361	68,959	70,057	6,131	8.8
Males.....	39,418	39,807	40,024	40,297	40,585	41,127	3,853	9.4
Females.....	27,418	27,507	27,889	28,064	28,374	28,930	2,288	7.9
Sales people (not traveling).....	31,000	30,490	31,832	32,853	33,611	37,591	7,146	19.0
Males.....	16,534	16,389	16,632	16,771	17,043	17,690	1,582	8.9
Females.....	14,466	14,101	15,200	16,082	16,568	19,901	5,800	29.1

Saleswomen show the greatest fluctuation in employment of any of the groups listed, the minimum of 14,101 in August being 29.1 per cent less than the maximum of 19,901 in December, this being largely due to the increase in the staffs of the retail stores during the December holiday season. But male wage earners, in a combined group of industries in which there are few markedly seasonal trades, showed almost as great a variation as saleswomen, the minimum being 24 per cent less than the maximum, and even clerical occupations, which are generally regarded as offering very stable employment, had a variation of 8.8 per cent from the maximum.

Fluctuations in employment for the manufacturing industries alone are shown in the next table. For all manufactures the variation was 23 per cent from the maximum. This may be compared with the percentage of 13.8 shown by the United States Census of 1909 as representing the maximum monthly employment fluctuation in the manufacturing establishments of Ohio in that year.¹

¹ Thirteenth Census of the United States, 1910. Supplement for Ohio, published in connection with the Abstract of the Census, p. 698.

NUMBER OF WAGE EARNERS EMPLOYED IN OHIO ON THE 15TH OF EACH MONTH DURING 1915 IN THE GENERAL MANUFACTURING INDUSTRY GROUPS.

Industry group.	Number of establishments reporting.	Number employed on the 15th of—					
		Jan.	Feb.	Mar.	Apr.	May.	June.
Chemicals and allied products.	301	11,410	11,599	11,832	12,069	11,924	11,864
Food and kindred products.	1,198	19,403	19,224	19,015	18,552	18,898	20,379
Iron and steel and their products.	1,394	141,309	149,012	155,543	161,342	163,792	171,416
Leather and its finished products.	174	18,317	18,134	17,784	16,577	16,389	17,024
Liquors and beverages.	198	5,641	5,694	5,690	5,878	6,089	6,112
Lumber and its manufactures.	802	23,289	24,263	25,031	25,456	25,163	25,394
Metals and metal products other than iron and steel.	296	16,015	16,809	18,040	18,767	18,675	19,065
Paper and printing.	894	25,163	25,303	25,386	25,155	25,113	25,072
Rubber products.	59	19,796	21,221	23,304	26,454	28,754	30,332
Stone, clay, and glass products.	721	34,351	35,382	38,445	39,890	41,142	40,398
Textiles.	657	33,280	35,805	36,665	35,920	34,330	34,827
Tobacco manufactures.	240	12,531	13,311	13,813	13,299	12,689	12,446
Vehicles for land transportation.	325	30,562	32,035	32,753	34,137	36,214	37,581
Miscellaneous industries.	631	29,836	31,333	32,514	33,529	34,280	34,947
Total manufactures.	7,890	420,903	439,125	455,815	467,025	473,452	486,857

Industry group.	Number employed on the 15th of—						Variation from maximum.	
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Number.	Per cent.
Chemicals and allied products.	11,889	12,089	13,089	12,552	12,844	13,452	2,042	15.2
Food and kindred products.	20,176	21,776	25,262	23,638	23,237	22,631	6,710	26.6
Iron and steel and their products.	173,935	178,299	184,823	186,112	191,441	201,972	60,663	30.0
Leather and its finished products.	17,444	17,815	17,581	17,317	18,041	18,546	2,157	11.6
Liquors and beverages.	6,320	6,291	6,117	5,876	5,825	5,697	679	10.7
Lumber and its manufactures.	24,677	25,025	25,187	25,874	24,704	26,061	2,772	10.6
Metals and metal products other than iron and steel.	18,705	19,413	20,213	20,861	21,566	22,249	6,234	28.0
Paper and printing.	24,821	24,926	25,723	26,218	26,520	26,631	1,810	6.8
Rubber products.	31,027	30,162	30,267	30,826	31,055	32,924	13,128	39.9
Stone, clay, and glass products.	37,815	38,546	40,164	40,504	40,996	40,861	6,791	16.5
Textiles.	34,864	35,851	36,310	36,855	35,773	35,481	3,575	9.7
Tobacco manufactures.	11,881	11,944	12,271	12,415	12,506	12,576	1,932	14.0
Vehicles for land transportation.	39,007	40,471	42,686	43,683	43,593	45,620	15,058	33.0
Miscellaneous industries.	35,109	35,015	36,468	37,155	39,082	41,926	12,090	28.8
Total manufactures.	487,670	497,623	516,161	519,886	527,183	546,627	125,724	23.0

The increase in the number of employees during 1915 was accompanied by an increase in the general wage level. The next table compares wages in 1915 with those of 1914 by classified wage groups. In practically every case it will be noted that the percentage of employees earning less than the specified amount was smaller in 1915 than in 1914, this indicating a rise in wages. Thus, in 1914, 56.9 per cent of the male wage earners received less than \$15 per week; by 1915, the number moving into the higher wage groups had reduced this percentage to 53.8.

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COMPARISON OF NUMBER AND PER CENT OF ADULT WORKERS EMPLOYED AT LESS THAN EACH SPECIFIED AMOUNT.

MALES.

Occupation and rate of wages per week.	As reported for 1914.		As reported for 1915.	
	Number of adult workers.	Per cent of total.	Number of adult workers.	Per cent of total.
Wage earners:				
Less than \$9.....	33,759	6.0	35,371	5.2
Less than \$10.....	66,553	11.7	68,015	10.0
Less than \$12.....	169,013	29.6	172,927	25.3
Less than \$15.....	325,273	56.9	368,099	53.8
Less than \$18.....	434,498	76.0	495,046	72.4
Less than \$25.....	538,043	94.1	632,503	92.5
Bookkeepers, stenographers, and office clerks:				
Less than \$9.....	2,784	7.9	3,043	7.5
Less than \$10.....	3,871	11.0	4,178	10.3
Less than \$12.....	6,937	19.7	7,343	18.1
Less than \$15.....	12,070	34.2	12,978	32.0
Less than \$18.....	18,903	53.5	20,500	50.6
Less than \$25.....	27,235	77.0	30,224	74.7
Salesmen (not traveling):				
Less than \$9.....	1,192	7.8	1,253	7.1
Less than \$10.....	1,677	11.0	1,746	9.9
Less than \$12.....	2,889	19.0	3,105	17.6
Less than \$15.....	5,531	36.4	6,171	34.9
Less than \$18.....	8,607	56.7	10,027	56.6
Less than \$25.....	12,081	79.6	14,279	80.6

FEMALES.

Wage earners:				
Less than \$5.....	7,714	8.0	8,248	7.4
Less than \$6.....	20,592	21.4	21,596	19.4
Less than \$7.....	38,997	40.5	42,398	38.1
Less than \$8.....	56,175	58.4	61,463	55.2
Less than \$9.....	68,962	71.7	77,428	69.5
Less than \$10.....	79,276	82.4	89,125	80.0
Less than \$12.....	89,370	92.9	102,029	91.6
Less than \$15.....	94,192	97.9	108,634	97.5
Bookkeepers, stenographers, and office clerks:				
Less than \$5.....	702	2.9	562	1.9
Less than \$6.....	1,694	7.0	1,573	5.3
Less than \$7.....	3,527	14.5	3,792	12.8
Less than \$8.....	5,884	24.1	6,527	22.1
Less than \$9.....	8,606	35.2	9,923	33.6
Less than \$10.....	11,008	45.0	12,965	43.9
Less than \$12.....	15,630	63.9	18,476	62.6
Less than \$15.....	20,048	82.0	24,064	81.6
Saleswomen (not traveling):				
Less than \$5.....	1,031	5.6	1,122	5.9
Less than \$6.....	3,666	20.1	3,008	15.9
Less than \$7.....	7,389	40.5	6,681	35.3
Less than \$8.....	10,079	55.3	10,095	53.4
Less than \$9.....	12,299	67.3	12,450	65.9
Less than \$10.....	13,635	74.8	14,062	74.4
Less than \$12.....	15,548	85.3	16,127	85.3
Less than \$15.....	16,856	92.5	17,572	92.9

The above tabulations, although indicating an important increase in wage rates in 1915 as compared with 1914, show large numbers of workers still employed at very low wages. Thus 25 per cent of the male wage earners, all adults over 18 years of age, earned less than \$12 per week in 1915, representing a maximum of some \$600 per year, and 38 per cent of the female wage earners, all adults over 18 years, earned less than \$7 per week, and only 20 per cent earned as much as \$10 per week.

INCREASE IN WAGES IN NOVEMBER AND DECEMBER, 1916.

The following tables present information obtained from various newspapers and periodicals showing wage increases secured by employees in manufacturing and other establishments in the United States during November and December, 1916. The figures presented in these tables were secured from 45 trade-union periodicals, 42 labor papers, 6 leading trade journals, and over 50 daily newspapers published in various parts of the country. No attempt has been made to verify the accuracy of the statements nor the figures given, but great care has been taken to eliminate all duplicates.

The reports for November, 1916, show 212 statements of wage increases in 38 States. Three of the reports relate to railroads and other interstate establishments. Of these 212 reports 131 show the number of establishments involved to be 163, and 77 reports show 187,207 employees affected. Of the 212 reports of wage increases 72 are stated to be the result of voluntary action on the part of the employer, 57 as the result of mutual agreement between employer and employees, 66 as the result of strikes, and for the remaining 17 no reason was stated. Table 2 shows the same information arranged by industry or occupation. This tabulation shows 77 reports which gave the number of employees affected, the largest number affected being in the following industries:

Foundry and machine shop-----	32, 436
Mining-----	27, 000
Iron and steel-----	24, 500
Boots and shoes-----	18, 300
Textile workers-----	17, 950
Tanning-----	15, 000

The publications examined for the month of December, as shown in Table 1, show 304 reports of wage increases. These were for establishments in 38 States, 21 of which were for railroads and other interstate establishments. Of these 304 reports 209 showed a total of 359 establishments involved. One hundred and forty reports showed the total number of employees benefited by the increase of wages to be 931,763. Of these 304 reports of wage increases 172 were reported to be the result of voluntary action of the employer, 45 as the result of mutual agreement between employer and employees, 33 as the result of strikes, and for the remaining 54 no reason was given. Table 2 shows the same information tabulated by industry or occupation. This table shows that the largest number of employees benefited were in the following industries:

Iron and steel-----	341, 600
Textile workers-----	208, 350

Garment workers.....	112,300
Workers in electrical supplies.....	60,000
Munitions.....	35,000
Boots and shoes.....	33,730
Telephone and telegraph service.....	25,000
Paper manufacturing.....	23,115

TABLE 1.—SUMMARY OF WAGE INCREASES, ESTABLISHMENTS INVOLVED, AND EMPLOYEES AFFECTED, BY STATES.

NOVEMBER, 1916.

State.	Total number of wage increases noted.	Reports showing establishments involved.		Number of reports not showing the number of establishments involved.	Reports showing employees affected.		Number of reports not showing number of employees affected.	Reason for increase.			
		Number.	Total number of establishments.		Number.	Total number of employees.		Agreement.	Strike.	Voluntary.	Other reasons and not reported.
Alabama.....	1	1	1	.....	1	20,000	.....	.....	.....	.....	1
Alaska.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arizona.....	1	.....	.....	1	.....	.....	1	1	.....	.....	.....
Arkansas.....	1	.....	.....	1	.....	.....	1	1	.....	.....	.....
California.....	7	3	3	4	1	200	6	4	1	2	.....
Colorado.....	5	2	2	3	.....	.....	5	4	.....	.....	1
Connecticut.....	7	3	3	4	4	995	3	2	3	2	.....
Delaware.....	1	1	1	.....	1	100	.....	.....	1	.....	.....
District of Columbia.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida.....	2	2	10	.....	2	1,830	.....	.....	2	.....	.....
Georgia.....	1	.....	.....	1	.....	.....	1	.....	.....	1	.....
Hawaii.....	1	.....	.....	1	1	300	.....	.....	1	.....	.....
Illinois.....	14	10	10	4	6	36,040	8	6	4	3	1
Indiana.....	1	1	3	.....	1	10,000	.....	.....	.....	1	.....
Iowa.....	1	1	2	.....	.....	.....	1	1	.....	.....	.....
Kansas.....	1	.....	.....	1	.....	.....	1	.....	.....	.....	1
Kentucky.....	3	3	3	.....	1	800	2	.....	.....	3	.....
Louisiana.....	1	1	1	.....	1	1,100	.....	1	.....	.....	.....
Maine.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland.....	4	.....	.....	4	2	633	2	2	1	1	.....
Massachusetts.....	13	8	15	5	8	13,700	5	1	6	5	1
Michigan.....	3	1	1	2	.....	.....	3	.....	1	1	1
Minnesota.....	4	4	5	.....	1	300	3	.....	1	3	.....
Missouri.....	11	7	7	4	7	7,232	4	5	2	2	2
Montana.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nebraska.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nevada.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Hampshire.....	1	.....	.....	1	.....	.....	1	.....	.....	1	.....
New Jersey.....	12	8	11	4	6	4,054	6	.....	6	5	1
New York.....	23	17	18	6	10	23,600	13	3	9	9	2
North Carolina.....	1	1	1	.....	.....	.....	1	.....	.....	1	.....
Ohio.....	18	9	9	9	4	17,323	14	7	3	8	.....
Oklahoma.....	4	2	2	2	.....	.....	4	2	1	1	.....
Oregon.....	4	2	2	2	.....	.....	4	2	1	1	.....
Pennsylvania.....	33	24	30	9	10	31,700	23	11	10	9	3
Porto Rico.....	2	.....	.....	2	.....	.....	2	.....	2	.....	.....
Rhode Island.....	6	5	6	1	6	7,800	.....	.....	2	4	.....
South Carolina.....	1	.....	.....	1	.....	.....	1	.....	.....	1	.....
Tennessee.....	2	2	2	.....	.....	.....	2	1	1	.....	.....
Texas.....	5	2	2	3	.....	.....	5	2	.....	2	1
Vermont.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Virginia.....	1	1	1	.....	.....	.....	1	.....	1	.....	.....
Washington.....	3	1	1	2	.....	.....	3	.....	3	.....	.....
West Virginia.....	2	1	1	1	.....	.....	2	.....	1	.....	1
Wisconsin.....	8	7	7	1	2	1,000	6	1	3	3	1
Interstate.....	3	1	3	2	2	8,500	1	.....	.....	3	.....
Total.....	212	131	163	81	77	187,207	135	57	66	72	17

In these reports there was no uniformity in stating the amount of increase, and in a large proportion of the cases it was not possible to determine a percentage. In the cases where the increase was stated in the form of percentage, or where a percentage could be computed, the prevailing increases were from 5 per cent to 10 per cent.

TABLE 1.—SUMMARY OF WAGE INCREASES, ESTABLISHMENTS INVOLVED, AND EMPLOYEES AFFECTED, BY STATES—Concluded.

DECEMBER, 1916.

State	Total number of wage increases noted.	Reports showing establishments involved.		Number of reports not showing the number of establishments involved.	Reports showing employees affected.		Number of reports not showing number of employees affected.	Reason for increase.			
		Number.	Total number of establishments.		Number.	Total number of employees.		Agreement.	Strike.	Voluntary.	Other reasons and not reported.
Alabama.....	3	2	5	1			3			2	1
Alaska.....	1			1			1				1
Arizona.....	2			2			2				2
Arkansas.....											
California.....	2	1	1	1	1	250	1	1	1		
Colorado.....	8	1	1	7	2	3,000	6	5		1	2
Connecticut.....	15	11	56	4	5	15,100	10	7		7	1
Delaware.....	1	1	1	1	1	35,000				1	
District of Columbia.....	1			1			1				1
Florida.....											
Georgia.....											
Hawaii.....	1	1	2				1	1			
Illinois.....	11	5	15	6	5	24,804	6	3	1	5	2
Indiana.....	1	1	1				1			1	
Iowa.....	2			2			2	1	1		
Kansas.....	3	1	1	2	1	16	2	1		1	1
Kentucky.....	2	2	2				2			2	
Louisiana.....	1	1	1				1				1
Maine.....	14	10	10	4	9	12,918	5	2	1	5	6
Maryland.....	1	1	1				1				1
Massachusetts.....	40	34	67	6	27	88,995	13	1	3	29	7
Michigan.....	4			4			4	2	1		1
Minnesota.....	4	3	5	1			4	1	1		2
Missouri.....	5	4	4	1	3	5,675	2	2		1	2
Montana.....	5			5			5	1	1	2	1
Nebraska.....	2	2	2				2			1	1
Nevada.....	1			1	1	1,800				1	
New Hampshire.....	5	5	5		2	18,100	3	1		4	
New Jersey.....	5	4	4	1	4	32,000	1		1	3	1
New York.....	26	18	20	8	10	104,580	16	4	6	14	2
North Carolina.....											
Ohio.....	15	10	10	5	3	2,220	12		4	8	3
Oklahoma.....											
Oregon.....	1			1			1			1	
Pennsylvania.....	41	35	73	6	21	71,900	20	3	8	28	2
Porto Rico.....											
Rhode Island.....	38	32	33	6	31	52,955	7	1	2	28	7
South Carolina.....	2	2	4				2	1			1
Tennessee.....	2	1	1	1	1	1,500	1		1	1	
Texas.....	8	3	3	5	2	2,700	6	2		4	2
Vermont.....	1	1	1		1	50				1	
Virginia.....											
Washington.....	3	1	1	2			3	1		2	
West Virginia.....	2	2	5		1	4,000	1		1	1	
Wisconsin.....	4	1	1	3	1	1,000	3	1		1	2
Interstate.....	21	13	23	8	8	453,200	13	3		17	1
Total.....	304	209	359	95	140	931,763	164	45	33	172	54

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TABLE 2.—SUMMARY OF WAGE INCREASES, ESTABLISHMENTS INVOLVED, AND EMPLOYEES AFFECTED, BY INDUSTRIES AND OCCUPATIONS.

NOVEMBER, 1916.

Industry or occupation.	Total number of wage increases noted.	Reports showing establishments involved.		Number of reports not showing the number of establishments involved.	Reports showing employees affected.		Number of reports not showing number of employees affected.	Reason for increase.			
		Number.	Total number of establishments.		Number.	Total number of employees.		Agreement.	Strike.	Voluntary.	Other reasons and not reported.
Banks and trust companies.....											
Barbers.....	2			2	1	200	1		2		
Boots and shoes.....	4	3	3	1	3	18,300	1	1	1	2	
Broom manufacturing.....	2	1	1	1			2	2			
Building trades.....	18	5	5	13	4	5,050	14	9	6	1	2
Carriages and automobiles.....											
Cement and concrete.....	7	1	1	6	1	1,500	6	6		1	
Chauffeurs.....	1			1	1	300		1			
Cigar makers.....	5	1	9	4	3	2,900	2		3	1	1
Coke makers.....											
Domestic and personal service.....	2			2			2	2			
Electrical supplies.....											
Express companies.....	1	1	3				1			1	
Food products.....											
Foundry and machine shops.....	¹ 22	16	20	6	8	32,436	14	5	9	6	2
Garment workers.....	9	6	6	3	2	1,300	7	3	4	2	
Glass manufacturing.....	1	1	1		1	500				1	
Hardware manufacturing.....	2	2	2		2	1,300				2	
Hotel and restaurant workers.....	3	2	2	1	2	95	1		1	2	
Iron and steel.....	10	10	12		7	24,500	3		1	7	2
Knit goods.....											
Laborers.....	4	3	3	1			4	1	1	1	1
Laundry.....	3			3			3	3			
Leather goods.....	4	4	6		3	700	1		3	1	
Longshoremen.....	5	2	2	3	2	330	3	1	4		
Lumber.....	2	1	1	1	1	23	1	1	1		
Messengers.....	2	2	3		1	2,000	1		2		
Mining.....	6	4	6	2	2	27,000	4	1	2	1	2
Municipal employees.....											
Munitions.....	1			1	1	300			1		
Office clerks.....	6	5	5	1	3	2,900	3	1		4	1
Oil workers.....											
Paper manufacturing.....	3	3	3		1	300	2		3		
Printing and publishing.....	8	2	3	6			8	6		1	1
Policemen.....	2	2	2				2			2	
Pottery and chinaware.....	2			2	2	8,500				2	
Pump manufacturing.....											
Railroads, steam.....	7	6	6	1	1	73	6	3	1	3	
Rubber goods.....	² 6	5	6	1	5	10,150	1		2	4	
Ship and boat building.....											
Slaughtering and meat packing.....	2	1	1	1	1	4,500	1		1	1	
Soap manufacturing.....	1	1	1		1	3,500				1	
Stove manufacturing.....											
Street railways.....	4	3	3	1			4	2	1	1	
Tanning.....	2	2	2		1	15,000	1	1	1		
Teamsters and drivers.....	6	2	2	4	1	200	.5	1	3	1	1
Telephone and telegraph.....											
Textile workers.....	³ 14	11	17	3	8	17,950	6		6	6	2
Theatrical employees.....	5	3	4	2	1	40	4	2	1	2	
Window cleaners.....	2			2			2		2		
Miscellaneous.....	26	20	22	6	7	5,360	19	5	4	15	2
Total.....	212	131	163	81	77	187,207	135	57	66	72	17

¹ Not including 1 report which also shows increases in rubber goods and textiles and is tabulated under textiles.² Not including 1 report which also shows increases in foundry and machine shops and textiles and is tabulated under textiles.³ Including 1 report which also shows increases in foundries and machine shops and rubber goods.

TABLE 2.—SUMMARY OF WAGE INCREASES, ESTABLISHMENTS INVOLVED, AND EMPLOYEES AFFECTED, BY INDUSTRIES OR OCCUPATIONS.—Concluded.

DECEMBER, 1916.

Industry or occupation.	Total number of wage increases noted.	Reports showing establishments involved.		Number of reports not showing the number of establishments involved.	Reports showing employees affected.		Number of reports not showing number of employees affected.	Reason for increase.			
		Number.	Total number of establishments.		Number.	Total number of employees.		Agreement.	Strike.	Voluntary.	Other reasons and not reported.
Banks and trust companies.....	4	3	3	1	1	200	3			3	1
Barbers.....	1			1			1		1		
Boots and shoes.....	9	7	8	2	6	33,730	3		1	6	2
Broom manufacturing.....											
Building trades.....	18			18	2	1,250	16	6	4	1	7
Carriages and automobiles.....	3	2	2	1	1	21,000	2		1	1	1
Cement and concrete.....	1	1	1		1	1,500					1
Chauffeurs.....											
Cigar makers.....	4	3	23	1	1	200	3	2	1	1	
Coke makers.....	2	1	1	1	1	1,000	1			1	1
Domestic and personal service.....											
Electrical supplies.....	1			1	1	60,000				1	
Express companies.....	1	1	1				1			1	
Food products.....	2	2	2		2	1,400			1	1	
Foundry and machine shops.....	27	20	57	7	11	8,655	16	5	4	14	4
Garment workers.....	8	4	16	4	4	112,300	4	2	3	2	1
Glass manufacturing.....	3	2	2	1	2	9,800	1			3	
Hardware manufacturing.....	2	2	2		1	850	1		1	1	
Hotel and restaurant workers.....	1			1			1	1			
Iron and steel.....	23	22	28	1	11	341,600	12		2	20	1
Knit goods.....	2	2	2		1	125	1			2	
Laborers.....	2	1	1	1			2			1	1
Laundry.....	1			1			1				1
Leather goods.....	6	5	5	1	2	1,000	4		1	5	
Longshoremen.....	1	1	1				1		1		
Lumber.....	4	2	10	2			4			3	1
Messengers.....	1	1	1				1		1		
Mining.....	7	2	2	5	3	7,800	4			4	3
Municipal employees.....	10	8	8	2	3	220	7			7	3
Munitions.....	1	1	1		1	35,000				1	
Office clerks.....	2	2	2		1	600	1			2	
Oil workers.....	4	3	3	1	2	12,500	2		1	2	1
Paper manufacturing.....	13	12	30	1	11	23,115	2	1	2	8	2
Printing and publishing.....	12	1	1	11			12	10		2	
Police.....											
Potters and chinaware.....	2			2			2		1		1
Pump manufacturing.....	2	2	3				2			2	
Railroads, steam.....	7	5	5	2	1	300	6	1		5	1
Rubber goods.....	5	4	4	1	4	8,100	1		1	3	1
Ship and boat building.....	3	3	4		1	2,400	2		1	2	
Slaughtering and meat packing.....	3	1	1	2			3	1		1	1
Soap manufacturing.....											
Stove manufacturing.....	4	4	4				4	4			
Street railways.....	5	5	5				5	2		2	1
Tanning.....											
Teamsters and drivers.....	3			3			3	3			
Telephone and telegraph.....	3	2	2	1	1	25,000	2	1		2	
Textile workers.....	68	59	105	9	55	208,350	13	1	3	52	12
Theatrical employees.....	1			1			1	1			
Window cleaners.....											
Miscellaneous.....	22	13	13	9	9	13,768	13	4	2	10	6
Total.....	304	209	359	95	140	931,763	164	45	33	172	54

STRIKES AND LOCKOUTS, JANUARY TO DECEMBER, 1916.

According to data compiled from various sources by the United States Bureau of Labor Statistics, the number of strikes and lockouts during the year of 1916 was 3,323. The number similarly compiled during the year 1915 was 1,229.

The following table shows the number of strikes and lockouts begun in each of the months of 1916, together with 331 strikes and lockouts reported as having occurred during the year, although the month in which they began was not reported. The number of strikes during the corresponding months of the year 1915 as compiled is also given. In comparing these figures it must be borne in mind that, although the number of strikes in 1916 has undoubtedly been larger than those of the corresponding months of 1915, the sources of the data in regard to strikes have also been increased, and the difference between the two years is therefore not so great as the figures would tend to show. The strikes and lockouts were distributed as follows:

NUMBER OF STRIKES AND LOCKOUTS BEGINNING IN EACH MONTH, JANUARY TO DECEMBER, INCLUSIVE, 1916 AND 1915.

Kind of dispute.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Month not stated.	Total.
Strikes:														
1916.....	143	161	220	317	493	258	248	264	213	273	190	111	311	3,202
1915.....	50	45	75	91	111	54	95	138	147	104	109	74	.....	1,093
Lockouts:														
1916.....	7	5	8	14	15	16	3	8	12	9	2	2	20	121
1915.....	13	12	14	16	11	6	14	9	15	8	10	8	.....	136
Total:														
1916..	150	166	228	331	508	274	251	272	225	282	192	113	331	3,323
1915..	63	57	89	107	122	60	109	147	162	112	119	82	.....	1,229

The above columns include disputes that began in the month indicated only and are subject to monthly revision. More detailed accounts of the disputes reported for each month preceding December may be found in former numbers of the REVIEW.

DISPUTES REPORTED DURING DECEMBER, 1916.

The number of strikes reported during December shows a continuation of the tendency to decrease each month. Aside from the clothing workers' strike in New York City there was no large strike reported during the month. The principal strikes were those of the bakers at Dayton, Ohio; the miners in Pennsylvania; carpenters in Philadelphia; lumber-mill workers in Minnesota; leather

workers in Lynn, Mass.; and textile workers in several New England towns.

The data in the following table relate to 242 strikes and lockouts, concerning which information was received by the bureau during the month of December. These include, in addition to the 113 strikes and lockouts which began in December, 128 strikes which were reported during December, but began as follows: Thirty-eight strikes in November, 38 strikes in October, 2 strikes in September, 6 strikes in August, 4 strikes in May, 4 strikes in April, 3 strikes in March, and 33 strikes and 1 lockout the dates of commencement of which were not reported but most of which probably occurred in November or December. Inasmuch as strikes which start toward the end of a month frequently do not come to the attention of the bureau until after the report for the month has been prepared, it is probable that corrected figures for December will show an increase over the number of strikes herein reported for that month. Nearly one-half of these strikes occurred in three States.

STATES IN WHICH FOUR OR MORE STRIKES AND LOCKOUTS WERE REPORTED DURING DECEMBER, 1916.

State.	Strikes.	Lockouts.	Total.
New York.....	46	1	47
Massachusetts.....	42	2	44
Pennsylvania.....	24		24
Ohio.....	21		21
Rhode Island.....	16		16
New Jersey.....	11		11
Illinois.....	8		8
Missouri.....	6		6
California.....	6		6
Michigan.....	6		6
Connecticut.....	4		4
Iowa.....	4		4
Oregon.....	4		4
Texas.....	4		4
21 other States.....	37		37
Total.....	230	3	242

Of the disputes reported during December, 187 strikes and 3 lockouts occurred east of the Mississippi and north of the Ohio and Potomac Rivers; 39 strikes west of the Mississippi; and the remaining 13 strikes in the district south of the Ohio and Potomac Rivers and east of the Mississippi.

In all but 11 strikes, which were confined to women, the strikers were men; 10 strikes and 1 lockout included both men and women; and in 29 strikes and 1 lockout the sex was not stated.

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The industries in which four or more strikes and lockouts were reported were as follows:

NUMBER OF STRIKES AND LOCKOUTS IN SPECIFIED INDUSTRIES REPORTED DURING DECEMBER, 1916.

Industry.	Strikes.	Lockouts.	Total.
Metal trades.....	33		33
Clothing.....	31		31
Building trades.....	29		29
Textile workers.....	22	2	24
Miners.....	18		18
Woodworkers.....	16		16
Teamsters.....	11		11
Cooks and waiters.....	7		7
Musicians and theatrical employees.....	6		6
Iron and steel workers.....	5		5
Tobacco workers.....	4		4
Barbers.....	4		4
Leather workers.....	4		4
Paper makers.....	4		4
Miscellaneous.....	35	1	36
Not reported.....	10		10
Total.....	239	3	242

Included in the above are 7 strikes of carpenters, 7 of electricians, 8 of machinists, and 14 of molders.

In 124 strikes and 1 lockout the employees were connected with unions; in 4 strikes they were not so connected; in 5 strikes they were not connected with unions at the time of striking, but became organized during the course of the strike; in the remaining 106 strikes and 2 lockouts it was not stated whether the men had union affiliation.

The following table shows the causes of 187 strikes and 2 lockouts. In 79 per cent of these the question of wages or hours, or both, was prominent.

PRINCIPAL CAUSES OF STRIKES AND LOCKOUTS REPORTED DURING DECEMBER, 1916.

Cause.	Strikes.	Lockouts.	Totals.
For increase of wages.....	89		89
For decrease of hours.....	18		18
For increase of wages and decrease of hours.....	28		28
General conditions.....	9		9
Conditions and wages.....	5		5
Conditions, wages, and hours.....	2		2
Recognition of the union.....	16	1	17
Recognition and wages.....	3		3
Recognition and hours.....	2		2
Recognition, wages, and hours.....	1	1	2
Because of discharge of employees.....	6		6
Because of presence of nonunion men.....	1		1
In regard to agreement.....	2		2
Sympathy.....	4		4
Jurisdiction.....	1		1
Miscellaneous.....	16		16
Not reported.....	36	1	37
Total.....	239	3	242

In 63 strikes the number of persons involved was reported to be 15,269, an average of 240 per strike. In 4 strikes, in each of which the number involved was 1,000 or more, the strikers numbered 4,700, thus leaving 10,569 involved in the remaining 59 strikes, or an aver-

age of 179 each. In 2 lockouts the number reported to be involved was 5,200.

In 159 strikes and 2 lockouts only 1 employer was concerned in each disturbance; in 5 strikes and 1 lockout, 2 employers; in 40 strikes, more than 2; in 35 strikes the number of employers was not stated.

In 39 strikes reported as ending in December 17 were won, 3 were lost, 15 compromised; in 2 the strikers returned to work under promise of the employer to arbitrate the matter in dispute; in 2 strikes and 1 lockout the result was not reported. The duration of 27 of these strikes was given as follows: One day, 2; 2 to 3 days, 3; 1 week, 6; 1 to 2 weeks, 4; 2 to 3 weeks, 4; 3 to 4 weeks, 3; 6 weeks, 2; 4 to 7 months, 3. The duration of all these strikes was 885 days. The duration of the 24 strikes lasting less than 3 months each was 322 days, or an average of 13 days each.

LAWS OF VARIOUS COUNTRIES FOR THE ADJUSTMENT OF DISPUTES BETWEEN RAILROADS AND THEIR EMPLOYEES.

Under the title "Railway Strikes and Lockouts"¹ the United States Board of Mediation and Conciliation has prepared a comparative analysis and digest of the legislation relative to strikes and methods of adjusting disputes as to wages and working conditions in the public-utility service in the principal commercial and industrial countries as well as in those countries where advanced or unusual ideas have been enacted into legislative form. It includes the full text of existing and proposed legislation, including the law proposed to amend the Canadian Industrial Disputes Investigation Act of 1907 and proposed legislation in the United States growing out of the threatened railroad strike in August, 1916. In the case of each country an explanatory statement, together with a brief history of legislative enactments for the prevention of strikes and the promotion of industrial peace, has been prepared. As bearing directly upon the consideration of the enactment of laws in this country providing a system of conciliation and arbitration, the laws selected for a comparative analysis are those of Canada, New Zealand, and the Commonwealth of Australia. A remarkable lack of uniformity in the laws of this character is noted, one nation adopting the plan of another in only one or two cases. The study revealed one prominent fact, that two factors have been responsible for antistrike legislation and legislation for the orderly settlement of industrial disputes.

One group of countries in framing such legislation has primarily had in mind the protection of the public against the injurious effects of industrial

¹ Railway Strikes and Lockouts. A study of arbitration and conciliation laws of the principal countries of the world providing machinery for the peaceable adjustment of disputes between railroads and their employees, and laws of certain countries for the prevention of strikes. United States Board of Mediation and Conciliation, Nov. 1, 1916. Washington, 1916. 367 pp.

warfare in the railway and other public-utility service. Such reasons are evidently responsible for the legislative enactments in Canada, France, Italy, Russia, Roumania, Spain, and Portugal. On the other hand, the preservation of industrial peace and the advancement in economic welfare of certain classes have been primarily considered in framing the legislation of Australasian countries, and the prevention of industrial conflicts in the railway service has been incidental to these broader purposes.

RETAIL PRICES OF FOOD IN THE UNITED STATES.

Reports of retail prices of food received by the Bureau of Labor Statistics for December 15, 1916, show an increase of 1 per cent over November 15, 1916, in the combined price of the principal articles of food.

Onions show the greatest increase over November 15, 1916, being 10 per cent higher on December 15. Cheese increased approximately 6 per cent; beans, 5 per cent; while pork chops show the greatest decrease, being approximately 5 per cent lower than on November 15. Flour shows a decrease of 4 per cent during the same period.

The following table shows the relative prices and the average prices of the principal articles of food on November 15 and December 15, 1916:

AVERAGE MONEY RETAIL PRICES AND RELATIVE RETAIL PRICES OF FOOD ON NOV. 15 AND DEC. 15, 1916.

[The relative price shows the per cent that the average price on the 15th of each month was of the average price of the year 1915.]

Article.	Unit.	Average money price.		Relative price (average price for the year 1915=100).	
		Nov. 15, 1916.	Dec. 15, 1916.	Nov. 15, 1916.	Dec. 15, 1916.
Sirloin steak.....	Pound.....	\$0.268-	\$0.268-	105+	105-
Round steak.....	do.....	.239-	.237-	105+	104+
Rib roast.....	do.....	.210	.210	105-	105+
Chuck roast.....	do.....	.169+	.168-	105-	104+
Plate boiling beef.....	do.....	.128-	.128-	105+	105-
Pork chops.....	do.....	.228-	.215+	112-	106+
Bacon, smoked.....	do.....	.303+	.301-	111+	110+
Ham, smoked.....	do.....	.302+	.302+	117+	117-
Lard, pure.....	do.....	.213+	.217+	144+	147-
Hens.....	do.....	.241+	.241+	116+	116+
Salmon, canned.....	do.....	.210	.214	105+	107-
Eggs, strictly fresh.....	Dozen.....	.506-	.519+	151-	155+
Butter, creamery.....	Pound.....	.439+	.454-	122-	126+
Cheese.....	do.....	.291+	.310-	126-	134-
Milk, fresh.....	Quart.....	.099	.102-	110-	113-
Bread.....	16-oz. loaf ¹.....	.068+	.069-	120-	121-
Flour, wheat.....	1-barrel bag.....	1.395-	1.334+	139-	133
Corn meal.....	Pound.....	.036+	.038-	116+	120+
Rice.....	do.....	.091-	.092-	100+	101-
Potatoes.....	Peck.....	.511+	.509-	223-	222+
Onions.....	Pound.....	.051-	.056+	148+	163-
Beans, navy.....	do.....	.135-	.142-	175+	184+
Prunes.....	do.....	.135+	.135+	102-	102-
Raisins, seeded.....	do.....	.137-	.139+	109+	111+
Sugar, granulated.....	do.....	.086+	.083+	131-	126+
Coffee.....	do.....	.302-	.302-	100-	100-
Tea.....	do.....	.551+	.551+	100+	100+
All articles combined.....	.....	.....	.....	124+	125+

¹ 16 ounces (weight of dough).

A comparison of prices on December 15, 1912, and December 15, 1916, shows an advance in the prices of all articles combined of 29 per cent.

All articles for which prices are shown for the 4-year period were higher on December 15, 1916, than on December 15, 1912, the greatest increase, 120 per cent, being that of potatoes. Flour increased 66 per cent; lard 37 per cent; while butter shows the smallest increase, being but 9 per cent higher on December 15, 1916, than on the same date in 1912.

The table below shows the relative prices and the average prices of the same articles of food for December 15 of each year from 1912 to 1916:

AVERAGE MONEY RETAIL PRICES AND RELATIVE PRICES OF FOOD ON DEC. 15 OF EACH YEAR, 1912 TO 1916.

[The relative price shows the per cent that the average price on the 15th of December was of the average price of the year 1915.]

Article.	Unit.	Average money price Dec. 15.					Relative price Dec. 15 (average for the year 1915=100).				
		1912	1913	1914	1915	1916	1912	1913	1914	1915	1916
Sirloin steak.....	Pound...	\$0.232+	\$0.250-	\$0.255+	\$0.250-	\$0.268-	91+	98-	100-	98+	105-
Round steak.....	do.....	.200+	.225+	.228-	.223-	.237-	88-	99-	100-	98-	104+
Rib roast.....	do.....	.184	.198	.200	.198	.210	92-	99	100-	99-	105+
Chuck roast.....	do.....			.164+	.158-	.168-			102-	98-	104+
Plate boiling beef.....	do.....			.125+	.119+	.128-			103+	98-	105-
Pork chops.....	do.....	.181-	.203+	.195+	.185+	.215+	89-	100+	96+	91-	106+
Bacon, smoked.....	do.....	.262+	.271-	.281+	.276-	.301-	96	99+	103+	101	110+
Ham, smoked.....	do.....	.248-	.263+	.266-	.266-	.302+	96-	102-	103-	103-	117-
Lard, pure.....	do.....	.158+	.158+	.154-	.145-	.217+	107+	107+	101+	98+	147-
Hens.....	do.....	.196-	.208+	.200-	.201-	.241+	94-	100+	96	98-	116+
Salmon, canned.....	do.....				.200	.214				100+	107-
Eggs, strictly fresh.....	Dozen.....	.415+	.469+	.469+	.459-	.519+	124-	140-	140+	137-	155+
Butter, creamery.....	Pound.....	.418-	.400-	.396+	.389-	.454-	116-	111-	110-	108	126+
Cheese.....	do.....				.236-	.310-				102+	134-
Milk, fresh.....	Quart.....	.091-	.093-	.092-	.090	.102-	101+	103-	102-	103+	113-
Bread.....	16-ounce loaf. ¹			.052+	.056-	.069-			92+	98+	121-
Flour, wheat.....	$\frac{1}{2}$ -barrel bag.	.803-	.783-	.903-	.913+	1.334+	80-	78+	90-	91-	133
Corn meal.....	Pound...	.029-	.030+	.031-	.031-	.038-	92+	96-	99-	99-	120+
Rice.....	do.....				.091-	.092-				100-	101-
Potatoes.....	Peck.....	.231+	.273-	.215+	.275+	.509-	101+	119+	91+	120-	222+
Onions.....	Pound.....				.035-	.056+				101-	163-
Beans, navy.....	do.....				.088-	.142-				114	181+
Prunes.....	do.....				.130+	.135+				98-	102-
Raisins, seeded.....	do.....				.126-	.139+				100+	111+
Sugar, granulated.....	do.....	.060+	.054+	.061-	.068-	.083+	91-	82-	92	103	126+
Coffee.....	do.....				.302-	.302-				100-	100-
Tea.....	do.....				.551+	.551+				100+	100+
All articles combined.....							97+	102+	103-	106-	125+

¹ 16 ounces (weight of dough).

RETAIL PRICES IN NEW YORK CITY.

Comparing prices of the same articles of food in New York City on December 15, 1915, November 15, 1916, and December 15, 1916, navy beans show the greatest increase from November 15 to December 15, 1916, the increase being 8 per cent. Pork chops show a decrease

of 6 per cent from November 15 to December 15, this being the greatest decrease.

All articles with the exception of pork chops show an increase from December 15, 1915, to December 15, 1916, the decrease of this article being 16 per cent. Potatoes show an increase of 82 per cent from December 15, 1915, to the same date in 1916.

AVERAGE MONEY RETAIL PRICES AND RELATIVE RETAIL PRICES OF FOOD IN NEW YORK CITY ON DEC. 15, 1915, AND NOV. 15 AND DEC. 15, 1916.

[The relative price shows the per cent that the average price on the 15th of each month was of the average price for the year 1915.]

Article.	Unit.	Average price.			Relative price (average for the year 1915=100).		
		Dec. 15, 1915.	Nov. 15, 1916.	Dec. 15, 1916.	Dec. 15, 1915.	Nov. 15, 1916.	Dec. 15, 1916.
Sirloin steak.....	Pound....	\$0.267-	\$0.283+	\$0.286-	99-	105+	106+
Round steak.....	do.....	.258-	.273+	.271-	99-	105+	104+
Rib roast.....	do.....	.221+	.235-	.237-	99+	105+	106+
Chuck roast.....	do.....	.165-	.178-	.173-	99-	107-	104-
Plate boiling beef.....	do.....	.150-	.165+	.164-	98+	108+	107+
Pork chops.....	do.....	.194+	.173+	.163-	92+	82-	77+
Bacon, smoked, sliced.....	do.....	.248-	.273-	.273-	99-	109-	109-
Ham, smoked.....	do.....	¹ .193-	¹ .227+	¹ .229-	102+	120-	121+
Lard, pure.....	do.....	.153-	.219-	.225+	99-	142-	146-
Hens.....	do.....	.214+	.258-	.255+	99-	119+	118+
Salmon, canned.....	do.....	.231-	.235+	.235+	99+	101+	101+
Eggs, strictly fresh.....	Dozen.....	.524+	.580+	.616+	131+	145+	154+
Butter, creamery.....	Pound.....	.414-	.449+	.457-	115+	125+	127+
Cheese.....	do.....	.239-	.291-	.298-	101-	123-	126+
Milk, fresh.....	Quart.....	.090	.097+	.099	100	108+	110-
Bread.....	16-oz. loaf ²	.059+	.068+	.071-	100-	115+	119+
Flour, wheat.....	$\frac{1}{2}$ -barrel bag	.912+	1.374-	1.312+	89+	134+	128-
Corn meal.....	Pound.....	.034+	.040-	.042-	101+	118-	123-
Rice.....	do.....	.092-	.091-	.093-	99+	98+	100+
Potatoes.....	Peck.....	.327+	.611+	.594+	115+	215+	209+
Onions.....	Pound.....	.044+	.064-	.067+	102+	146-	155+
Beans, navy.....	do.....	.091-	.145-	.157-	106+	169-	183+
Prunes.....	do.....	.140-	.146-	.149-	96+	100-	102+
Raisins, seeded.....	do.....	.123-	.133-	.136+	101-	109+	112-
Sugar, granulated.....	do.....	.064+	.081+	.078+	108-	136+	131+
Coffee.....	do.....	.290+	.290+	.290+	100-	100-	100-
Tea.....	do.....	.463+	.463+	.463+	101+	101-	101-

¹ Whole.

² 16 ounces (weight of dough).

RETAIL PRICES IN PHILADELPHIA, PA.

Both relative and actual average prices are shown for Philadelphia, Pa., as follows:

AVERAGE MONEY RETAIL PRICES AND RELATIVE RETAIL PRICES OF FOOD IN PHILADELPHIA, PA., ON DEC. 15, 1915, AND NOV. 15 AND DEC. 15, 1916.

[The relative price shows the per cent that the average price on the 15th of each month was of the average price for the year 1915.]

Article.	Unit.	Average price.			Relative price (average for the year 1915=100).		
		Dec. 15, 1915.	Nov. 15, 1916.	Dec. 15, 1916.	Dec. 15, 1915.	Nov. 15, 1916.	Dec. 15, 1916.
Sirloin steak.....	Pound.....	\$0.297-	\$0.317+	\$0.317+	99+	106-	106-
Round steak.....	do.....	.251+	.272-	.272-	97-	105+	105-
Rib roast.....	do.....	.211+	.237-	.235-	99+	111-	110-
Chuck roast.....	do.....	.176-	.193+	.190-	100-	110-	108-
Plate boiling beef.....	do.....	.116-	.127+	.126+	99-	109+	108-
Pork chops.....	do.....	.186+	.239-	.235-	89+	114-	112-
Bacon, smoked.....	do.....	.268+	.300+	.300+	101-	113-	113-
Ham, smoked.....	do.....	.301-	.351+	.351+	101+	118+	118-
Lard, pure.....	do.....	.141-	.214-	.215+	100+	152+	153-
Hens.....	do.....	.229+	.273+	.278+	99-	118+	120-
Salmon, canned.....	do.....	.176+	.185+	.187-	99+	104+	105+
Eggs, strictly fresh.....	Dozen.....	.481+	.506-	.541+	137+	144+	154+
Butter, creamery.....	Pound.....	.454+	.487+	.504-	110-	118+	122-
Cheese.....	do.....	.242+	.289+	.308+	102+	122-	130-
Milk, fresh.....	Quart.....	.080	.088	.088	100	110+	110+
Bread.....	16-oz. loaf ¹	.048-	.056-	.057+	101-	118-	121-
Flour, wheat.....	1-barrel bag	.896-	1.413+	1.324-	90-	142	133-
Corn meal.....	Pound.....	.028+	.037+	.039+	99-	131-	138+
Rice.....	do.....	.095-	.098-	.098-	100-	103-	103-
Potatoes.....	Peck.....	.348+	.654+	.646-	124+	233+	230-
Onions.....	Pound.....	.037-	.058+	.066+	110-	174+	198+
Beans, navy.....	do.....	.087-	.132+	.138-	113	172+	179+
Prunes.....	do.....	.137-	.138+	.141-	100-	101-	103-
Raisins, seeded.....	do.....	.115+	.120+	.126+	96+	100	105+
Sugar, granulated.....	do.....	.065+	.080+	.077+	107-	132-	127+
Coffee.....	do.....	.296-	.293-	.296-	100-	99+	100-
Tea.....	do.....	.572+	.561-	.561-	101-	99-	99-

¹ 16 ounces (weight of dough).

Onions show the greatest increase in price—14 per cent—from November 15, 1916, to December 15, 1916, while wheat flour shows a decrease of 6 per cent, this being a greater decrease than that shown by any other article.

In the comparison of prices on December 15, 1915, and December 15, 1916, potatoes show the greatest increase—86 per cent. Tea is the only article that shows a decrease, the price on December 15, 1916, being 2 per cent lower than on December 15, 1915.

RETAIL PRICES IN FOREIGN COUNTRIES.

The exceedingly irregular mail service between this country and Austria and Germany have made it impossible to obtain quotations of retail prices from these two countries from direct sources. In the last publication of retail prices in foreign countries in the MONTHLY REVIEW (Vol. III, No. 5, November, 1916) quotations from Austria and Germany were for this reason entirely omitted. Conditions as to mail service having become still worse in the interim, and desiring to make the list of foreign countries included in the publication of retail prices as complete as possible, the bureau, in order to continue the publication of such price statistics from Austria and Germany, has availed itself of the price quotations presented for these two countries in the British Board of Trade Labor Gazette.

In the following paragraphs relating to the course of retail prices in foreign countries the latest available statistics are given in every case, but it will be observed that while the quotations for Great Britain relate to the beginning of December, 1916, those for the other countries relate to various earlier dates. As prices in all countries are moving upward this difference of date should be borne in mind in making comparisons between the various countries included below. With regard to the figures for Berlin, Vienna, and Italian cities, it should also be remembered that they are based on maximum prices fixed by law, and therefore are not exactly comparable with figures which are mainly based on prices fixed in an open market.

For some countries both actual and relative prices are given, while for others only relative prices or per cent of increase compared with some date prior to the war are given. In several of the countries the actual prices of bread will strike the American consumer as somewhat surprising in view of the high prices in American cities. Thus in London, on December 1, 1916, the predominant prices per 4 pounds of wheat bread, actual weight, were 20 and 21 cents; in Italy the price of wheat bread per pound in October, 1916, was 4.1 cents; in Christiania the price of rye bread in October, 1916, was 5.3 cents per pound, while in Copenhagen in October, 1916, the price of rye bread was 2.7 cents per pound in loaves weighing 8.8 pounds per loaf.

AUSTRIA.

The usual official returns in "Waarenpreisberichte" not being available for a later period than the middle of September¹ the

¹ According to the "Waarenpreisberichte," retail food prices in September, 1916, were 168.6 per cent higher than in July, 1914.

Board of Trade Labor Gazette reprints the following tabular statement published in the Vienna Arbeiter Zeitung of November 26, 1916:

PERCENTAGE INCREASE IN PRICE OF FOOD COMMODITIES IN VIENNA, NOV. 5 TO 14, 1916, OVER JULY 25, 1914, AND NOV. 7 TO 13, 1915.

Article.	Per cent increase (+) or decrease (−) in prices in the period, Nov. 5 to 14, 1916, as compared with—	
	Nov. 7 to 13, 1915.	July 25, 1914.
Beef:		
Fore quarter	+72.2	+389.5
Hind quarter	+73.7	+365.9
Pork	+34.4	+290.9
Bacon	+14.2	+445.2
Lard	+14.3	+410.6
Milk	+20.9	+ 79.3
Butter:		
Native	+44.4	+188.9
Imported	+22.1	+290.8
Margarine	+83.1	+500.0
Flour, wheat	+62.2	+166.7
Bread, rye	−11.2	+ 64.9
Eggs	+66.7	+311.8
Potatoes	+24.1	− 21.7
Haricot beans	+24.0	+307.9
Sugar	+13.3	+ 29.1
Total (weighted average)	+24.9	+176.7

According to the preceding table food prices in the Austrian capital were in November, 1916, about 177 per cent higher than in July, 1914. This is a much larger increase than in any other capital of the countries now at war. Compared with prices a year ago there was an average increase of about 25 per cent. The only decrease recorded is for rye bread, the price of which was 11 per cent lower than that reported for November, 1915.

CANADA.

The Canadian Labor Gazette reports that in November, 1916—

Prices were again steeply upward. In retail food prices advances occurred in nearly all lines except meats, but were especially high in eggs, butter, cheese, and potatoes. Bread and flour were also higher. The cost of a list of staple foods for a family of five averaged \$10.05 in 60 cities of the Dominion as compared with \$9.30 in October and \$8.02 in November last year. All commodities were higher than a year ago, except coffee, but the chief increase was in potatoes.

The table which follows shows the cost of a week's supply of staple foods in terms of the average prices in 60 cities in different Provinces of the Dominion.

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COST PER WEEK OF A FAMILY BUDGET OF STAPLE FOODS IN TERMS OF THE AVERAGE PRICES IN 60 CITIES OF THE VARIOUS PROVINCES OF CANADA, 1910 TO 1916.

Province.	1910	1911	1912	1913	1914	1915	November, 1914.	November, 1915.	October, 1916.	November, 1916.
Nova Scotia.....	\$6.817	\$6.776	\$7.166	\$7.289	\$7.475	\$7.826	\$7.764	\$8.071	\$8.774	\$9.682
Prince Edward Island.....	5.812	5.795	6.107	6.338	6.693	6.617	6.725	7.023	7.796	8.203
New Brunswick.....	6.548	6.836	7.130	7.041	7.443	7.682	7.722	7.866	8.873	9.662
Quebec.....	6.331	6.457	6.968	6.870	7.158	7.387	7.437	7.578	8.946	9.380
Ontario.....	6.504	6.666	7.251	7.203	7.479	7.676	7.716	7.947	9.405	10.025
Manitoba.....	7.462	7.405	7.884	7.873	8.149	8.071	8.147	8.190	8.867	9.295
Saskatchewan.....	7.859	8.083	8.164	8.250	8.327	8.299	8.822	8.181	9.111	9.825
Alberta.....	7.998	8.081	8.147	8.327	8.266	8.209	8.406	8.175	9.305	9.753
British Columbia.....	8.321	8.789	9.028	9.128	7.606	8.807	9.319	8.618	9.793	10.267
Total (all Provinces)....	6.954	7.138	7.339	7.337	7.731	7.866	7.955	8.016	9.295	10.045

FRANCE.

The October issue of the official journal of the French Statistical Office (Bulletin de la Statistique Générale de la France) shows an increase of 41 per cent in the cost of living in French towns of over 10,000 inhabitants (not including Paris) during the third quarter of 1916 as compared with the third quarter of 1914. This estimate is founded upon continued investigations of the retail prices of 13 commodities of ordinary consumption as returned from the several cities in question. The prices obtained for each article are multiplied by the respective quantities consumed by an average workman's family as disclosed by an investigation in 1910 by the statistical office (see MONTHLY REVIEW, July, 1916, p. 84), and the results are added to secure the total cost of the budget at the desired period of time.

Below are shown the results of these investigations since the first quarter of 1911, for all France and for each geographical division. An index number has been calculated for "All France," with the cost of the budget for the third quarter of 1914 as the base, or 100.

COST PER YEAR OF A FAMILY BUDGET OF 13 STAPLE ARTICLES OF FOOD, FUEL, AND LIGHTING IN TERMS OF THE AVERAGE RETAIL PRICES IN FRENCH CITIES OF OVER 10,000 INHABITANTS, EXCEPT PARIS, BY GEOGRAPHICAL DIVISIONS AND FOR ALL FRANCE, AT INDICATED PERIODS OF TIME, 1911 TO 1916.

Period.	All France.		Geographical divisions.				
	Amount.	Relative cost.	North.	East.	South-east.	South.	West.
First quarter, 1911.....	\$195.70	101.0	\$204.39	\$193.39	\$212.88	\$195.90	\$191.65
First quarter, 1913.....	194.93	100.6	201.30	190.88	199.95	200.33	190.11
Third quarter, 1914.....	193.77	100.0	212.11	190.68	196.47	190.68	181.81
First quarter, 1915.....	213.46	110.2	223.88	213.46	215.20	210.37	205.74
Third quarter, 1915.....	238.36	123.0	246.85	232.57	237.58	243.37	231.02
First quarter, 1916.....	257.85	133.1	273.10	246.27	256.11	267.88	245.11
Second quarter, 1916.....	266.15	137.3	279.85	253.02	269.04	270.78	252.44
Third quarter, 1916.....	274.06	141.4	281.97	266.15	277.15	281.01	263.06

GERMANY.

According to the following table, computed in the British Board of Trade Labor Gazette from the official figures published in the Statistische Korrespondenz, the general index number of retail food prices in Berlin in October, 1916, shows a decrease of 4.6 per cent, as compared with that for September of the same year. This has been brought about mainly by recent reductions, imposed by regulation, in the Berlin maximum prices of war bread, rye flour, potatoes, and beef. The drop of 36 per cent in the price recorded for coffee appears to be due to a different cause, viz, the selection of a lower quality of coffee as the basis for the October price quotation. The price quoted for that month, 1.4 marks (33.3 cents) per German pound, is that of a mixture containing only 25 per cent of genuine coffee.

PERCENTAGE OF INCREASE OR DECREASE OF RETAIL FOOD PRICES IN BERLIN IN OCTOBER, 1916, AS COMPARED WITH THOSE IN JULY, 1914, AND SEPTEMBER, 1916.

Article.	Percentage of increase (+) or decrease (-) in price in October, 1916, as compared with—	
	September, 1916.	July, 1914.
Rye bread.....	-15.0	+ 21.4
Wheat bread.....	+16.7	+ 48.9
Rye flour.....	- 9.1	+ 33.3
Wheat flour.....	+ 8.3	+ 23.8
Butter.....	No change.	+105.8
Lard.....	No change.	+315.6
Sugar.....	No change.	+ 36.0
Coffee.....	-36.4	- 9.7
Eggs.....	- 5.9	+357.1
Milk.....	No change.	+ 45.5
Beef.....	- 5.3	+182.4
Mutton.....	No change.	+164.7
Veal.....	- 8.7	+105.9
Pork.....	No change.	+117.9
Bacon.....	No change.	+249.4
Potatoes.....	-15.4	+ 37.5
Rice.....	No change.	+420.0
Split peas.....	- 6.7	+145.0
Haricot beans.....	+ 1.0	+106.0
Total (weighted percentage increase or decrease).....	- 4.6	+109.4

GREAT BRITAIN.

The general level of retail prices of food rose by about 3 per cent between November 1 and December 1, 1916, according to the Board of Trade Labor Gazette for December. The largest increases recorded were for eggs, 17 per cent (largely seasonal), and cheese, 17 per cent. Meat, tea, and sugar showed but little change in price, but bread, potatoes, and butter advanced by 4 per cent and flour by 5 per cent during the month. Bacon, margarine, and milk increased in price by about 2 per cent.

Retail prices of food on December 1, 1916, as compared with those ruling on December 1, 1915, showed an average advance of 29 per cent. The price of meat increased during the year by about 20 to 25 per cent, except frozen mutton, which rose over 30 per cent. Potatoes on December 1, 1916, were considerably more than double the price of a year earlier. Granulated sugar, eggs, and cheese were dearer by 40 per cent, 35 per cent, and 30 per cent, respectively. Tea alone among the articles included in the returns remained practically unchanged in price.

Taking the country as a whole and making allowance for the relative importance of the various articles in working-class household expenditure, the average increase in retail prices of food between the beginning of the war and December 1, 1916, was 84 per cent, which is reduced to 78 per cent if the increase in the duties of tea and sugar is deducted. The actual prices for bread (20 and 21 cents per 4 pounds, actual weight, in London on Dec. 21, 1916) are somewhat surprising to the American consumer, in view of prices in American cities (see pp. 240-243). These London prices were 4 cents per 4 pounds above those of December 1, 1915. The increases during the period July 1, 1914, to December 1, 1916, in the individual articles are shown in the following table for small and large towns and for the entire United Kingdom:

PERCENTAGE INCREASE IN PRICES OF FOOD COMMODITIES IN GREAT BRITAIN ON DEC. 1, 1916, OVER JULY, 1914.

Article.	Percentage increase from July, 1914, to Dec. 1, 1916.		
	Large towns, population over 50,000.	Small towns and villages.	United Kingdom.
Beef, British:			
Ribbs.....	59	59	59
Thin flank.....	86	69	78
Beef, chilled or frozen:			
Ribbs.....	83	79	81
Thin flank.....	101	91	96
Mutton, British:			
Legs.....	56	54	55
Breast.....	90	69	79
Mutton, frozen:			
Legs.....	87	81	84
Breast.....	121	113	117
Bacon (streaky).....	58	52	55
Fish.....	147	106	126
Flour (households).....	81	89	85
Bread.....	76	66	71
Tea.....	51	50	51
Sugar (granulated).....	173	166	170
Milk.....	55	49	52
Butter:			
Fresh.....	68	68	68
Salt.....	67	67	67
Cheese.....	68	68	68
Margarine.....	22	22	22
Eggs (fresh).....	179	178	178
Potatoes.....	130	95	112
Total (weighted percentage increase).....	87	80	84

ITALY.

The semimonthly Bollettino of the Italian labor office publishes each month a short table of retail prices of seven articles of ordinary consumption, showing average prices in several cities (40 to 43), as furnished by cooperative stores, local labor unions, and chambers of commerce. Relative prices of these same commodities are also shown in parallel columns, the base from which changes are reckoned being the average prices for the year 1912.

The following table shows the actual and relative prices of the seven commodities for each of the months July, August, September, and October in 1915 and 1916:

ACTUAL AND RELATIVE PRICES OF FOODSTUFFS BASED ON AVERAGE PRICES IN 43 CITIES IN ITALY.

Average actual prices.

Article.	Unit.	July.		August.		September.		October.	
		1915	1916	1915	1916	1915	1916	1915	1916
		<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>	<i>Cents.</i>
Bread, wheat.....	Pound..	4.2	4.1	4.3	4.0	4.3	4.0	4.2	4.1
Flour, wheat.....	do.....	4.7	4.5	4.8	4.4	4.8	4.3	4.8	4.3
Macaroni, spaghetti, etc.....	do.....	5.9	6.7	6.2	6.7	6.1	6.8	6.2	6.7
Beef.....	do.....	17.8	21.6	19.1	21.1	19.7	20.1	20.0	20.7
Lard.....	do.....	21.9	25.1	22.6	25.5	23.5	25.7	23.6	24.8
Oil, table.....	Quart.....	36.0	43.3	38.2	44.0	38.2	44.0	39.3	44.9
Milk.....	do.....	6.5	6.8	6.3	7.1	6.7	7.1	6.6	7.1

Relative prices. [Average prices for 1912=100.]

Bread, wheat.....	Pound..	113.2	111.0	116.2	108.6	114.8	108.4	113.6	109.6
Flour, wheat.....	do.....	120.8	116.5	123.7	112.9	121.9	112.0	121.9	111.3
Macaroni, spaghetti, etc.....	do.....	121.4	137.6	127.1	137.6	124.7	138.9	128.2	137.4
Beef.....	do.....	118.0	143.6	126.7	140.0	130.8	138.4	133.1	137.8
Lard.....	do.....	120.2	138.0	124.0	139.9	128.8	141.3	129.8	136.1
Oil, table.....	Quart.....	98.5	117.0	104.5	120.5	104.5	120.5	107.5	123.0
Milk.....	do.....	103.2	108.7	101.1	113.7	106.6	112.8	105.8	114.0
All commodities.....		113.6	124.6	117.6	124.7	118.8	124.6	120.0	124.2

NETHERLANDS.

The following table is published in the Journal (Maandschrift) of the Dutch statistical office for November, 1916, and presents the yearly relative prices for 1913, 1914, and 1915, based on the average monthly price for 29 articles of daily consumption and the relative prices for the months of January to October, 1916. The basic prices are those reported by two cooperative associations—one with branches at Amsterdam, Haarlem, Arnhem, Utrecht, and Leeuwarden and the other at The Hague. The average prices reported for 1893 are taken as the base for calculating the relative prices.

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RELATIVE RETAIL PRICES IN THE NETHERLANDS, 1913, 1914, 1915, AND JANUARY TO OCTOBER, 1916.

[Average prices, 1893=100.]

Commodity.	1913	1914	1915	Jan., 1916.	Feb., 1916.	Mar., 1916.	Apr., 1916.	May, 1916.	June, 1916.	July, 1916.	Aug., 1916.	Sept., 1916.	Oct., 1916.
Beans:													
Brown.....	154	157	175	196	204	211	214	218	221	214	214	225	296
White.....	166	176	200	210	210	221	241	255	310	314	314	345	328
Peas:													
Chick.....	150	161	178	175	175	175	175	181	189	194	194	208	228
Yellow.....	125	139	157	157	157	157	157	150	157	161	164	161	205
Green.....	157	143	160	207	213	213	207	207	213	213	213	223	247
Barley, pearl.....	113	116	142	152	152	152	155	158	161	165	165	171	177
Buckwheat, groats..	104	117	171	187	192	192	192	192	196	204	204	208	208
Oatmeal.....	103	103	137	140	140	140	140	147	153	153	153	159	157
Cheese:													
Leyden.....	140	139	160	161	164	164	164	191	187	187	184	183	186
Full cream.....	124	125	137	127	124	128	125	130	133	133	129	117	115
Coffee.....	94	88	91	96	97	99	100	104	103	103	103	103	103
Oleomargarine.....	127	99	102	102	105	110	111	111	111	111	111	111	111
Flour:													
Rye.....	85	81	115	119	119	122	122	122	130	133	141	141	141
Wheat.....	124	129	159	153	153	153	159	165	165	165	159	165	171
Buckwheat.....	105	110	152	176	176	176	181	181	186	200	209	210	214
Butter.....	94	97	130	144	144	144	146	147	149	149	152	152	153
Cooking.....	135	142	207	226	223	228	226	226	226	226	226	226	227
Oil, rape.....	136	137	192	186	199	208	212	216	216	216	216	116	218
Rice.....	116	116	128	125	125	131	141	156	141	141	241	141	141
Soda.....	83	83	117	233	233	250	283	283	283	300	300	300	300
Starch.....	103	107	130	137	137	143	150	153	167	170	170	170	170
Sirup.....	100	100	125	132	146	146	150	150	154	161	161	161	161
Sugar:													
Moist.....	89	91	105	115	115	115	115	115	115	115	115	115	115
Granulated.....	85	89	98	100	100	100	100	100	102	102	100	95	97
Tea.....	112	113	116	120	120	120	119	121	119	119	119	119	119
Vermicelli.....	121	128	203	207	207	207	207	207	207	207	207	207	207
Soap:													
White, Bristol..	100	100	119	126	123	123	123	123	126	126	130	134	134
Green, soft.....	87	87	121	123	142	150	154	158	158	158	158	162	171
Salt.....	80	80	90	90	90	90	90	90	90	90	90	90	90
Average, all commodities.....	114	116	142	153	155	158	161	164	168	170	170	173	199

If one were to make the price level or index number of 1913 the base from which to reckon, it would appear that prices were 1.8 per cent higher in 1914 than in that year and 24.6 per cent higher in 1915, with continuing increases during each succeeding month of 1916, except August, as follows: January, 34.2 per cent; February, 36 per cent; March, 38.6 per cent; April, 41.2 per cent; May, 43.9 per cent; June, 47.4 per cent; July and August, 49.1 per cent; September, 51.8 per cent; and October, 74.6 per cent.

SCANDINAVIAN COUNTRIES.

Retail prices averaged from monthly quotations reported by dealers in the capital cities of the three Scandinavian Kingdoms are published in a recently received number of the journal of the Swedish labor office. They are stated to be generally quite comparable, habits of consumption and manners of life being very similar in the three countries.

A comparative table, showing both actual average prices and relative prices of 21 different commodities of ordinary household consumption, follows:

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ACTUAL AND RELATIVE PRICES OF 21 ARTICLES OF HOUSEHOLD CONSUMPTION IN THE CAPITAL CITIES OF THE SCANDINAVIAN COUNTRIES, JULY, 1914, JULY, 1916, AND OCTOBER, 1916.

[Source: Social a Meddelanden utgivna av K. Socialstyrelsen, Stockholm, 1916, No. 10, pp. 1181, 1182.]

Average prices.

Article.	Unit.	Stockholm.			Christiania.			Copenhagen.		
		July, 1914.	July, 1916.	Oct. 1916.	July, 1914.	July, 1916.	Oct., 1916.	July, 1914.	July, 1916.	Oct., 1916.
		Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.
Milk, whole.....	Quart.....	4.3	5.3	5.3	4.8	6.6	6.6	4.8	6.1	7.1
Butter, creamery.....	Pound.....	29.9	36.5	39.6	31.1	40.1	44.2	28.6	36.6	45.6
Oleomargarine, vegetable.....	do.....	16.9	24.3	31.2	17.0	20.9	22.1	15.2	19.9	19.9
Eggs, strictly fresh.....	Dozen.....	24.1	35.5	48.1	28.9	52.9	62.4	24.1	42.6	56.9
Potatoes.....	Bushel.....	66.1	60.4	90.7	98.2	100.1	¹ 66.1	47.2	113.3	86.9
Peas, yellow.....	Pound.....	3.2	6.3	7.2	4.9	11.5	12.0	4.9	10.1	9.8
Flour:										
Wheat.....	do.....	3.9	4.5	4.6	3.9	5.3	6.3	3.2	4.5	4.6
Rye.....	do.....	2.9	3.3	3.4	2.4	4.7	5.7	-----	-----	-----
Oatmeal.....	do.....	4.1	6.0	6.1	4.4	6.6	6.8	4.7	8.9	8.9
Rye bread, soft.....	do.....	4.9	7.4	7.7	2.9	4.7	5.3	² 1.8	² 2.7	² 2.7
Beef:										
Steak.....	do.....	15.2	31.7	32.6	16.0	39.8	34.8	³ 17.0	³ 37.9	³ 28.9
Soup.....	do.....	12.4	23.9	26.7	15.3	36.2	31.4	⁴ 13.4	⁴ 33.6	⁴ 25.4
Veal:										
Steak, fat.....	do.....	17.6	29.4	32.2	17.1	39.5	-----	⁵ 17.0	⁵ 35.7	⁵ 30.0
Steak, tender.....	do.....	12.3	19.7	22.5	10.1	27.5	24.1	⁶ 13.4	⁶ 31.8	⁶ 26.6
Pork:										
Fresh.....	do.....	18.1	28.6	34.3	17.6	34.9	41.7	⁷ 13.4	⁷ 14.6	⁷ 14.6
Salt.....	do.....	18.2	31.1	34.8	19.4	37.4	43.8	-----	-----	-----
Coffee, Santos.....	do.....	20.2	24.7	33.2	26.0	27.8	31.2	25.5	30.0	30.4
Sugar, loaf.....	do.....	7.8	8.3	8.3	6.9	13.1	13.0	5.2	6.3	6.6
Kerosene.....	Gallon.....	18.3	27.4	29.4	18.3	29.4	29.4	18.3	21.3	21.3
Coal.....	Bushel.....	22.6	49.6	54.3	17.8	62.3	55.2	16.1	64.2	53.4
Coke, gas.....	do.....	12.6	26.9	26.9	15.6	33.5	33.5	11.8	26.0	26.0

Relative prices.

Milk, whole.....	Quart.....	100	124	124	100	137	137	100	126	147
Butter, creamery.....	Pound.....	100	122	133	100	129	142	100	128	160
Oleomargarine, vegetable.....	do.....	100	144	185	100	123	130	100	131	131
Eggs, strictly fresh.....	Dozen.....	100	147	199	100	183	216	100	177	236
Potatoes.....	Bushel.....	100	91	137	100	102	67	100	240	184
Peas, yellow.....	Pound.....	100	200	227	100	238	248	100	208	203
Flour:										
Wheat.....	do.....	100	116	119	100	138	163	100	142	146
Rye.....	do.....	100	113	117	100	195	235	-----	-----	-----
Oatmeal.....	do.....	100	144	147	100	150	156	100	187	187
Rye bread, soft.....	do.....	100	153	158	100	163	183	100	147	147
Beef:										
Steak.....	do.....	100	209	214	100	248	217	100	223	170
Soup.....	do.....	100	193	216	100	237	205	100	251	190
Veal:										
Steak, fat.....	do.....	100	167	183	100	230	-----	100	210	176
Steak, tender.....	do.....	100	160	183	100	272	239	100	238	199
Pork:										
Fresh.....	do.....	100	158	189	100	198	237	100	109	109
Salt.....	do.....	100	171	191	100	193	225	-----	-----	-----
Coffee, Santos.....	do.....	100	122	164	100	107	120	100	118	119
Sugar, loaf.....	do.....	100	106	106	100	189	188	100	121	126
Kerosene.....	Gallon.....	100	150	161	100	161	161	100	117	117
Coal.....	Bushel.....	100	220	241	100	351	311	100	400	332
Coke, gas.....	do.....	100	214	214	100	215	215	100	220	220

¹ Maximum price fixed by law.

² Price per pound, rye bread baked in 8.8-pound loaves.

³ Beef, fore part, highest price.

⁴ Beef, fore part, lowest price.

⁵ Veal, fore part, highest price.

⁶ Veal, fore part, lowest price.

⁷ Pork, fresh shoulder.

EFFECT OF THE MINIMUM WAGE IN RETAIL STORES IN MASSACHUSETTS.¹

January 1, 1916, was fixed as the date on which the third wage decree of the Massachusetts Minimum Wage Commission, covering

¹ Massachusetts Minimum Wage Commission, Bulletin No. 12, November, 1916. Preliminary report on the effect of the minimum wage in Massachusetts retail stores. 53 pp.

female employees in retail stores, was to become effective. According to its provisions no female employee of ordinary ability aged 18 or over, having at least one year's experience, should be paid less than \$8.50 a week; if inexperienced, she should be paid not less than \$7; if under 18, the minimum wage should be \$6 for those aged 17, and \$5 for those younger.

This decree was the most important yet issued, especially in the number of employees affected by it. It was also the most vigorously opposed. It was attacked through newspapers and at public hearings, and one merchants' and manufacturers' association issued a pamphlet asserting that an attempt to enforce it would inevitably lead to a widespread discharge of women who under its terms would be entitled to wage increases, to the substitution of men and minors for experienced women over 18, and to a reduction of wages among those already receiving more than the minimum. Some of these results, especially the discharge of experienced workers, it was declared were already painfully evident in January, 1916.

Early in February, 1916, the commission undertook an investigation into the workings of the decree. Its purposes and scope are thus set forth:

On February 7 the commission began a systematic inspection of the pay rolls of retail stores throughout the State for the purpose of ascertaining, first, which establishments failed to follow its recommendations, and secondly, what was the effect of the decree in the establishments where it had been put into operation. Between February 7 and September 7, 1916, agents of the commission inspected and transcribed the pay-roll records, in so far as they relate to women and girls, of 969 retail establishments operated by 886 individuals, firms, or corporations, and located in 37 cities and towns. These establishments employ altogether 16,036 full-time workers, and over 1,000 extras or part-time workers. In 14 of these establishments, however, women were employed only as extras. * * * For 917 of the 969 establishments investigated information regarding rates of pay both before and after the operation of the decree was secured. In addition pay-roll records were secured for a corresponding period in 1915 for such establishments as had been included in the preliminary investigation of 1914, and had informed the commission of their acceptance of its recommendations prior to February 7, 1916. These establishments, 16 in number, were chosen in order to make possible a comparison of the wage level of 1916 with that of the two preceding years.

Of the establishments investigated 167 had already notified the commission of their acceptance of the decree. These employed 11,763 women (73.4 per cent of the total number of full-time workers in the 955 establishments), or on an average 70 full-time workers each. Those which had not reported their acceptance were much smaller establishments, employing on an average five full-time workers each. Three of the 167 were found to have made no effort to comply with the terms of the decree; in these 27 women were

receiving less than the recommended minimum rates. In the remaining 164 many changes in rates had been made, but 187 women were still receiving less than the minimum rates.

In most of these establishments the violations were very few in number, and in nearly every case resulted from oversight or misunderstanding of the terms of the decree, and were corrected immediately after being brought to the attention of the management.

Of the 788 establishments which had not notified the commission of their acceptance of the decree, 577 were already paying such rates that no changes were made necessary by the decree, 85 which had been paying lower rates had made the changes necessary to conform to the decree, 14 others had complied in part, and 112 had made no changes and were still paying rates below the standard set by the decree. Of the 16,036 women employed as full-time workers in all the establishments inspected, 93.8 per cent were receiving not less than the recommended rates.

The inspection of the pay rolls of retail stores shows, therefore, not only that practically all of the proprietors of establishments published as formally accepting the commission's recommendations did so in good faith, but also that by far the greater number of other retail establishments throughout the State, large and small, are at present following or seriously attempting to follow the recommendations of the commission.

Taking up the second point, the effect of the decree upon the workers, the agents found that in 917 of the establishments it was possible to get the rates of pay both before and after January 1, 1916, at which date the decree became operative. These were divided into three groups—the establishments which had paid not less than the recommended rates before the decree was issued, those which changed their rates to make them correspond to the commission's recommendations, and those which did not make their rates correspond with the commission's recommendations. Leaving out of consideration the new workers, the following figures show what changes were made in the wage level on or about January 1, 1916, and how many and what proportion of the female workers were affected by them:

NUMBER AND PER CENT OF FEMALE WORKERS (EXCLUDING NEW EMPLOYEES) AFFECTED BY CHANGES OF WAGES IN EACH GROUP, ON OR ABOUT JAN. 1, 1916, IN 917 ESTABLISHMENTS.

Female workers—	Working at increased rates.		Working at reduced rates.	
	Number.	Per cent.	Number.	Per cent.
In first group.....	320	23.6	1	0.1
In second group.....	5,324	48.4	12	.1
In third group.....	364	25.2	2	.1
Total.....	6,008	43.5	15	.1

One point of interest about these figures is their bearing on the assertion often made by opponents of the minimum wage that its adoption would at once lead to a reduction in the wages of the more highly paid, the minimum being taken as the standard toward which employers would level down as well as up. In these groups the proportion of workers whose wages were reduced was the same whether the employers were already paying not less than the minimum rates, whether they raised the wages of numbers in order to comply with the terms of the decree, or whether they ignored it altogether. Comparing groups 2 and 3, the proportion receiving increases was nearly twice as great in group 2 as in group 3, while the proportion reduced was the same. After the wage changes of January 1 were made, of the 1,356 employees in the first group (new employees being still omitted from consideration), none received less than the minimum rates recommended by the commission; of the 11,008 in the second, 185, or 1.7 per cent, received less than the minimum rates, while of the 1,446 in the third, 53.6 per cent received less than the recommended rates.

Another way of getting at the effect on the worker is by comparing the wage grouping in 1915 and 1916 of the 5,324 workers in the second group of establishments whose wages were raised to correspond with the commission's recommendations. The following table shows the advance in the wage level which these changes produced:

NUMBER AND PER CENT OF FEMALE WORKERS RECEIVING SPECIFIED RATES OF WAGES BEFORE AND AFTER WAGE DECREE WENT INTO EFFECT.

Wage group.	Women receiving specified rates before change.		Women receiving specified rates after change.	
	Number.	Per cent.	Number.	Per cent.
Under \$5.....	469	8.8	.....	.....
\$5 but under \$6.....	346	6.5	274	5.1
\$6 but under \$7.....	785	14.7	285	5.4
\$7 but under \$8.....	1,229	23.1	337	6.3
\$8 but under \$8.50....	2,214	41.6	29	.5
\$8.50 and over.....	281	5.3	4,399	82.6
Total.....	5,324	100.0	5,324	100.0

The change is even greater than indicated here, because of the 469 in the first column who received less than \$5 about one-eighth received less than \$4, so that the advance was for them a considerable one; well over one-half received \$4 but under \$4.50. There is no indication of how many of those in the \$8.50-and-over group received more than \$8.50 before the change, but afterwards 405 received

more than \$8.50. The amount of increase naturally varied considerably:

Of the 5,324 women whose wages were raised, 3,093, or over one-half (58.1 per cent), received increases of \$1 or more; 2,109, or almost two-fifths (39.6 per cent), received increases of at least \$1.50; 902, or one-sixth (16.9 per cent), received increases of at least \$2; and 710, or almost one-seventh (13.3 per cent), received increases of at least \$2.50.

In line with these findings was the fact that the average wages in the 14 retail stores from which wage data for three years were available showed a marked rise after the adoption of the decree. For the full-time female worker in these stores the average wage for the first week in February, 1914, was \$7.76; in 1915 it was \$7.99; and in 1916 it was \$8.75.

As far as wages are concerned, the effect of the decree upon women employees seems wholly good. Does it, however, lead to a reduction in the number employed? Do employers lay off the poorer workers rather than pay them higher wages? The answer does not seem entirely clear. From 14 stores data were obtained as to the number of female employees for the first week in February, 1914, 1915, and 1916. The actual number of full-time female workers in these stores in 1914 was 4,087, in 1915 it had sunk to 3,824, and in 1916 to 3,650. In 1915, then, before the minimum-wage decree had been issued, there had been a decrease of 6.4 per cent, and the next year showed another falling off of 4.7 per cent. The commission is convinced that this second falling off can not be ascribed directly to the effect of the minimum-wage decree:

The information relative to individual establishments and occupations shows that the decline in the number employed must be attributed chiefly to other causes. Of these the most important are: First, the general trade conditions prevailing in the latter part of 1914 and the earlier part of 1915, which were undoubtedly responsible for a considerable part of the decrease throughout the entire labor force shown by the figures for 1915; and secondly, the movement toward greater efficiency in store management, which the introduction of the minimum wage doubtless accelerated, reflected in the marked reduction in the numbers employed in unskilled occupations.

On the whole, this view seems to be supported by a comparison of the reductions in each class of employees, and the average actual wage paid in that class in February, 1915, the figures being as follows:

DECREASE IN NUMBER OF FEMALE WORKERS IN 14 BOSTON DEPARTMENT AND DRY-GOODS STORES IN FIRST WEEK IN FEBRUARY, 1916, AS COMPARED WITH FIRST WEEK IN FEBRUARY, 1915, AND AVERAGE WAGE PAID IN FIRST WEEK IN FEBRUARY, 1915, BY CLASSES OF EMPLOYEES.

Class of employee.	Decrease in February, 1916, as compared with February, 1915.		Actual average wage paid February, 1915.
	Number.	Per cent of decrease.	
Saleswomen.....	11	0.5	\$8.68
Office employees.....	39	5.5	7.91
Counter cashiers and examiners.....	44	13.2	5.32
Messengers and bundlers.....	41	24.7	3.55
Alteration workroom employees.....	4	2.8	10.40
Other workroom employees....	16	18.7	8.59
Stock girls.....	39	34.8	5.89
Miscellaneous.....	2	1.7	8.37

¹ Increase.

Here the largest percentages of reduction are found among the lowest paid and least skilled workers, who would naturally be the first laid off as efficiency methods were introduced. In a report published in March, 1915, before the minimum-wage decree was promulgated, the commission alluded to the growing tendency to dispense with some classes of unskilled employees, notably the messengers and bundlers.¹ It is evident that the changes shown in the above table might be explained either by a movement toward greater efficiency in store management, or by a determination to let the less skilled workers go rather than pay them the rates demanded by the decree. It is impossible to say with certainty from the facts given which of these causes was responsible for the situation shown in 1916. Possibly no valid conclusion can be reached until the decree has been in operation longer, and until we have fuller information as to the age and wage distribution of the female employees, and of the male employees as well. But at least it can be said with assurance that in these 14 stores the adoption of the minimum-wage decree has not led to any general or extensive discharge of female workers.

Another objection brought against the minimum wage was that its adoption would lead to the discharge of full-time workers and the substitution of extra or part-time workers. The following figures show the situation in this respect in the same 14 stores:

¹ Massachusetts Minimum Wage Commission, Wages of Women in Retail Stores, Bulletin No. 6, p. 18.

EXTRA EMPLOYEES IN 14 DEPARTMENT AND DRY-GOODS STORES, FIRST WEEK IN FEBRUARY, 1914, 1915, AND 1916, AND PER CENT OF PAY ROLL PAID TO THE EXTRAS.

Year.	Extras employed.		Pay roll.	
	Number.	Per cent of total female force.	Total for week.	Per cent paid to extras.
1914.....	389	8.7	\$32,843.69	3.5
1915.....	210	5.2	31,159.61	1.9
1916.....	301	7.6	32,973.71	3.1

The extras, like the regulars, showed a decided falling off in 1915, though proportionately their decrease was greater. In 1916 they had regained some part of their decrease, but did not form as important a part of the total force, either in proportionate number or in percentage of the pay roll coming to them, as they had in 1914. If the adoption of the minimum wage has any tendency to lead to the substitution of extras for the regular employees it certainly had not become visible at the time of taking these figures. Incidentally it may be mentioned that the wage level among the extras reflected the advance shown among the regulars. The proportion of extras receiving \$5 or over in 1914 was 20.5 per cent; in 1915 it had sunk to 14.3 per cent, and in 1916 had risen to 30.2 per cent.

Summing up the findings of the report, it appears that of the 16,036 full-time female workers in the retail stores investigated, about three-fourths were in stores which had formally accepted the decree and were trying in good faith to carry it out; about one-sixth were in establishments which, while not formally accepting the decree, were nevertheless complying with its terms, and only one-tenth were in establishments which practically refused to accept the decree. The effect of the adoption of the decree on the wage level of the nine-tenths was marked and favorable, and there was no indication of any tendency to level down to the minimum. In regard to effect upon the number employed, the situation was so complicated by the depression of 1914-15 and other factors that it is impossible to speak with much certainty. In the stores from which comparative data for three years were obtained the number of full-time female employees was smaller by 263 in 1915 than in 1914, and 1916 showed 174 fewer employed than in 1915. Whether the tendency to recover from the depression of 1914 had been checked by the adoption of the minimum wage, and if so, to what extent men were being substituted for the women formerly employed, can probably be determined only by a future investigation. No effects were observed which might not reasonably be accounted for by a movement toward greater efficiency in store management. The commission thinks it probable that such

a movement had been accelerated by the coming into effect of the minimum wage, but holds that it was bound to take place sooner or later, regardless of the wage decree. There was no evidence to show that extras were being substituted for regular full-time workers.

BEHIND THE SCENES IN A RESTAURANT—A STUDY OF WOMEN RESTAURANT EMPLOYEES.

As far back as 1883 a bill was introduced into the New York Legislature forbidding the employment of women in manufacturing establishments more than 10 hours a day. That particular bill was defeated, but the fight was kept up until now it is illegal in New York to employ women in factories and mercantile establishments more than 54 hours or 6 days a week, or between 10 o'clock at night and 6 in the morning. Moreover, there are numerous restrictions as to the kind of work they may do, and under what conditions and in what surroundings they may do it. But while, during these 33 years, some portion of the safeguards they need have been secured for the workers in factories and stores, women employed by the thousand in other lines of work have been left unprotected. The Consumers' League of New York City has recently undertaken a study of conditions in one of these other branches—restaurant work—in which between 15,000 and 20,000 women are employed in New York State, and has published the results in a very readable pamphlet.¹ The purpose of the study is thus expressed:

In undertaking the investigation, the league sought to answer three questions: First, what are the actual conditions of labor prevailing in the restaurants of New York State; second, are these conditions such that the worker may lead a wholesome, normal life; and third, how do these conditions react through the individual worker upon society as a whole.

The investigation covered a group of 1,017 women and girls employed in restaurants in New York and six other large cities of the State. Waitresses made up over half of the group (53.5 per cent), cooks formed about one-fifth, and kitchen helpers a little over one-fourth of the total. The majority were foreign born, the American born forming a little less than one-third. Austro-Hungarians made up practically two-fifths of the group, no other nationality furnishing as much as one-tenth. One-fourth were under 21 years old, and 44 per cent were 21 but under 30, the proportions in these age groups differing according to the occupation, 15 per cent of the waitresses, 21 per cent of the cooks, and 48 per cent of the helpers being under

¹ Behind the Scenes in a Restaurant. The Consumers' League of New York City, 1916, 47 pp.

21.¹ Almost one-third (31.8 per cent) were married, 53 per cent were single, and the remainder were widowed or separated from their husbands.

The actual conditions of labor, as represented by the experiences of this group, leave much to be desired, the two most objectionable features being the long hours and the heavy, nerve-racking character of the work. The hours vary widely. The custom of having a certain number of girls come on duty for only the principal meal of the day gives a group whose hours are very short, but the hours for the full-time workers run up sometimes to almost incredible lengths. A little over two-fifths (42 per cent) worked less than 55 hours a week; one-fifth worked less than 35 hours weekly. At the other end, one-fifth worked over 75 hours, and 5 per cent over 85 hours weekly. Eighteen were found who worked over 95 and six who worked over 105 hours weekly. Such hours mean a seven-day week as well as fearfully long daily hours. Unfortunately, the continuous week is not confined to the 18 having such excessive hours. "A 12-hour day and a seven-day week is the lot of one-fifth of these workers." Also, the long hours are not restricted to the older workers; of those working over 75 hours a week nearly two-fifths (37 per cent) were 21 but under 30, and one-fourth (26.6 per cent) were under 21. The probable effect of such hours on the health of the workers, especially when these are young girls under 21, needs no emphasizing.

The character of the work increases the strain of these hours. The strain, the heat, and the hard, continuous work involved in cooking are well known. The kitchen helper must be prepared to do any kind of hard and heavy work, with no opportunities for rest, and the waitresses must carry heavy trays of food and be almost continuously on their feet, incidentally walking miles each day in their journeyings to and from the kitchen. All the workers need much endurance, and all must work at high tension.

A waitress must not only remember a multitude of orders and fill them quickly, but she must keep her temper under the exactions of the most trying customer. The cook must keep her head amid the confusion and noise of a hot, crowded kitchen. The kitchen girl must be everywhere at once with a helping hand, and the dish washer's very job depends upon her quickness. One of this latter group said that she washes 7,000 articles in an hour and a half.

The strain of such conditions is intensified by the fact that there is no provision for any rest period during the day. The law requires

¹ The age level of these restaurant workers seems considerably higher than that prevailing in the factory industries of New York City. The New York State Factory Investigating Commission published in 1915 the results of a study of workers in the shirt-making industry, in confectionery, and in paper-box making. The number of female factory workers studied in New York City was, shirt makers, 4,776; paper-box makers, 5,522; confectionery workers, 4,797. The proportions of these three groups under 21 were, respectively, 68.5 per cent, 60.6 per cent, and 60.1 per cent. That is, in all three of these groups the proportion under 21 was nearly the same as the proportion of restaurant workers under 30. (See Fourth Report of Commission, Vol. III, pp. 805, 829, and 856.)

that girls in stores and factories must have at least one-half hour off for luncheon, but there is no such requirement for restaurant workers. "They must eat when they can snatch a minute from work," and the investigators noted many complaints of indigestion and loss of appetite as a result of haste and irregularity in taking meals.

Where working conditions are bad it is naturally assumed that wages should be high to strike some sort of balance, but wages in the restaurants are about on the usual level of those in unskilled industries for women. One-fourth of the group were paid less than \$5 a week, while over two-fifths received \$5 but less than \$7 a week. Nine dollars has been fixed as the minimum on which a girl can live properly in New York, but 89 per cent of this group received less than this sum. Even when due allowance is made for tips and for meals given in addition to the money wage, 31 per cent received less than \$9. Tips, it must be remembered, are received only by the waitresses. For these they make a very important addition to the nominal wage, bringing up the proportion who received \$9 or over a week from 3.4 per cent to 50.5 per cent, but the cooks and kitchen girls have no share in this alleviation of conditions. The cooks received higher wages than the other groups, over two-fifths of their number reaching or passing the \$9 which is considered essential, but the kitchen girls showed a distressingly low level; one-seventh earned less than \$5, and three-fifths earned \$5 but under \$7 a week. Only 2 per cent earned over \$9.

Nightwork existed, but was not common for women. The fact that only 4 per cent of the women interviewed worked at night is held to prove that such work is unnecessary. The majority of employers secure men for nightwork, and the remainder could easily do so if the law forbade the employment of women during the hours when they may not work at factory occupations. Naturally, all the objectionable features of the work are intensified when the employee is a nightworker.

It is to be regretted that more information about the married women in the work (31.8 per cent) is not given. It is said that "many of them are one-meal girls—that is, they are employed only for the rush hour at noon." It would be interesting to know exactly how many of them were one-meal girls, and how many of the remainder were working 12 hours or even more a day, or were among the limited number found working at night. It is highly undesirable that any woman should work such hours, but if after having done so she must then contrive to get in some kind of housekeeping for children who must be either neglected or cared for by some make-shift arrangement while she is away, the strain on the woman herself and also the social significance of the situation are seriously increased. Likewise fuller information as to how many are working a 7-day week would be

useful. Are all whose hours exceed 75 working 7 days? Or do some of these put in for 6 days a week the 15-hour day, which we are told is not uncommon? And how are wages related to hours? How many of the 89 per cent of waitresses whose wages fall below \$9 a week were one-meal girls, putting in only a few hours a day, and working only to "earn a little extra money while their husbands are at work, either as 'pin money' for themselves or to help toward the support of the children"?

The report gives a graphic and striking picture of the hardships endured by restaurant workers. These hardships do not seem inherent in the work; they have been found in almost every form of factory work, and no restaurant keeper could protest the impossibility of modifying them more strenuously than did the manufacturing interests when first it was proposed to bring the factories under control. To meet the situation the league recommends amendments to the mercantile law, bringing restaurant workers under its general provisions. This would do away with the long hours, with night-work, with the 7-day week, and would provide a regular time off each day for meals.

RECENT REPORTS RELATING TO WORKMEN'S COMPENSATION AND ACCIDENT INSURANCE.

MASSACHUSETTS.¹

The Industrial Accident Board of Massachusetts, in its report to the legislature of 1917, strongly urges that the compensation act be made compulsory. The present act is elective, and although employers not electing lose certain defenses in case of damage suits, a number of employers have remained outside the act, and their employees are not entitled to compensation payments in case of injury. Reports of the inability of widows and other dependents to obtain adequate settlement with noninsured employers, as well as appeals from injured employees whose employers have neglected to come within the provisions of the statute, show the necessity of the compulsory law.

The report says: "If the idea upon which the law of modern workmen's compensation for injuries in the course of their work rests is just, there is no good reason why a small percentage of the employers of the State should be permitted to avoid the duty to their employees which the great majority elect to assume." The board urges that if a constitutional amendment is necessary to accomplish the change immediate steps should be taken to that end.

¹ Information from Boston Evening Transcript, Jan. 4, 1917 p. 3.

NEVADA.

Approximately 80 per cent of the premium income of the workmen's compensation insurance fund of Nevada during the three-year period ending June 30, 1916, was derived from 390 active contributors representing the mining industry; 20 per cent was received from 396 contributors representing railways, public utilities, State, counties, cities, and schools, and by miscellaneous industries. The amount of premiums collected and due was \$743,051.69 (\$35,634.41 being the amount due), and the total compensation incurred was \$651,150.38, of which \$322,230.17 was paid. The administrative expense was \$89,474.45, or 12.04 per cent of the earned premiums. During the same period 4,153 accidents were reported, of which 107 fatal and 2,080 nonfatal cases were compensable. Of these 2,187 cases the mining industry was responsible for 1,914 (87.5 per cent). The compensation cost for each compensable accident was \$297.74, and the average for each fatal accident was \$2,656.38. There were 3 permanent total disability cases involving a compensation cost of \$14,552.58; 236 permanent partial disability cases involving a compensation cost of \$180,775.98; and 1,841 temporary disability cases involving a compensation cost of \$171,589.26. The accident frequency rate per 1,000 3,000-hour workers in all industries per annum was 127.55. These data are summarized in the following tables compiled from the recently issued report of the Nevada Industrial Commission covering the entire history of the compensation act, from July 1, 1913, to June 30, 1916.¹ The first table shows the financial experience by class of industry, and the second table the accident experience by nature of disability.

FINANCIAL EXPERIENCE UNDER THE NEVADA WORKMEN'S COMPENSATION INSURANCE ACT FOR THE THREE-YEAR PERIOD ENDING JUNE 30, 1916.

Class.	Average number employees per annum. ²	Pay-roll exposure.	Premiums collected and due.	Compensation incurred.	Compensation cost per \$100,000 of pay roll.
Mining ³	7,463	\$28,322,066.15	\$609,606.74	\$557,660.64	\$1,968.99
Railroads.....	448	1,152,307.00	22,429.19	12,630.43	1,096.44
Public utilities.....	470	1,159,604.21	21,345.76	19,303.23	1,664.64
State, counties, cities, and schools.....	913	3,409,082.79	30,307.10	10,714.35	314.28
Miscellaneous.....	2,012	4,524,604.83	59,362.90	50,841.73	1,123.68
Total.....	11,306	38,567,664.98	743,051.69	651,150.38	1,688.04

¹ Nevada. Report of the industrial commission reviewing the administration of the Nevada industrial insurance act for the period of three years, July 1, 1913, to June 30, 1916. Carson City, 1917. 110 pp.

² Computed on the basis of 360 days of 8 hours each to the year, or a total of 2,880 hours per man per annum.

³ In the report the mining industry is divided into three classes—mining, ore reduction, and Nevada Consolidated Copper Co.

ACCIDENT EXPERIENCE UNDER THE NEVADA WORKMEN'S COMPENSATION INSURANCE ACT FOR THE THREE-YEAR PERIOD ENDING JUNE 30, 1916.

Result of accident.	Number.	Rate per 1,000 employees per annum. ¹	Rate per 1,000 3,000-hour workers per annum. ²	Compensation incurred.	Average per accident.	Per cent.
Fatal.....	107	3.15	3.29	284,232.56	2,656.38	43.65
Permanent total disability.....	3	.09	.09	14,552.58	4,850.86	2.24
Permanent partial disability.....	236	6.96	7.25	180,775.98	765.99	27.76
Temporary disability.....	1,841	54.27	56.54	171,589.26	93.20	26.35
Total.....	2,187	64.47	67.17	651,150.38	297.74	100.00
Noncompensable.....	1,966	57.96	60.38	.....	.....	.....
Total.....	4,153	122.44	127.55	651,150.38	156.79	.....

¹ For average number of employees per annum see preceding table.² Reduced to the basis of 3,000-hour workers, the average of 11,306 employees in the preceding table becomes 10,854.

The report of the commission shows that the State fund received from all sources a total of \$710,969.78 and expended \$501,617.29, leaving a balance on June 30, 1916, of \$209,352.49.

Of the 4,153 accidents reported, 1,652, or 39.78 per cent, involved disabilities lasting not more than one week. This does not necessarily represent the noncompensable accidents for the three-year period for the reason that under the original act the waiting period was two weeks and was later reduced to one week. The number of noncompensable accidents for the entire period was 1,966. In 2,270 cases (54.65 per cent of all accidents) the period of disability terminated during the first two weeks. In 618 cases (14.88 per cent) the period of disability terminated within the second week. Thus, had the waiting period not been reduced to one week, approximately 15 per cent of the total accidents would not have been compensable. Excepting 107 fatalities and 3 permanent disabilities, it is estimated that employees lost, as a result of injuries, 108,939 days and \$427,933.37 in wages. The average time lost on account of all disabilities was 26.9 days and the average wage loss was \$105.84. The average daily wage of those injured was \$3.935. In the mining industry a fatality rate of 4.78 per 1,000 2,880-hour employees (4.89 per 1,000 3,000-hour employees) per annum is shown. Of all the accidents in the three-year period due to mining operations, exclusive of quarries and pit mining, the greatest number, 658, or 22.4 per cent, was due to falls of rock or ore from roof or wall. Haulage accidents came second, with a total of 356, or 12.1 per cent. A total of 131 dependents were left as a result of the 107 fatal accidents.

Based upon an experience of three years, it has been found necessary to increase the insurance rates in two classes to avoid the recurrence of a deficit which has developed in that time. In mining operations, not including clerical office employees, the rate has been

increased from 2.410 per cent of pay roll, the average for three years, to 3.5 per cent of pay roll; and in mills or ore works, not including clerical office employees, the new rate is 2 per cent of pay roll instead of 1.419, the average for three years. For smelters and plaster mills the rate is $1\frac{1}{2}$ per cent of pay roll. It is pointed out that this new rate as applied to mining operations, which became effective on January 1, 1917, is considerably below that established in other States for the same industry. In California the rate is 5.75 and in Colorado 3.85.

OHIO.

According to the statistics of mines and quarries in Ohio for the year 1915, included in report No. 25 of the State industrial commission, issued on June 27, 1916,¹ 925 coal mines reported in operation produced 22,627,046 tons of coal, an increase of 20.8 per cent over 1914. The number of workers was 41,430, of whom 3,882 were employed in pick mines and 37,548 in machine mines. The average number of days worked by 3,067 pick miners was 168, and the average worked by 23,976 loaders (including drillers and shooters) in machine mines was 137. The average daily wages of pick miners and loaders was \$2.72 and \$2.75, respectively, while the highest average daily wage, \$4.11, was received by 3,154 machine runners and helpers. The total wage and salary payment for the 827 mines reporting on that point aggregated \$18,154,682, of which 98.4 per cent went to wage earners, exclusive of office employees.

While stating that 63 fatal accidents—one accident to every 359,159 tons mined,² were reported to the inspector of mines during 1915, the report tabulates only accidents for which awards were made by the commission. Thus statistics for 48 fatal accidents, 2 permanent total disability cases, and 2,728 other nonfatal accidents are given. The awards for these 2,778 accidents aggregated \$220,060.28, or an average of \$79.22 per case. For death benefits the awards were \$88,892; for compensation, \$103,889.46; for medical and hospital expenses, \$21,422.50; ³ for burial expenses, \$5,856.32.

The report estimates that the time lost as a result of coal-mine accidents for which awards were made during 1915 was equal to the entire time of 1,663 men for one year, a figure determined by combining the life expectancy of the men killed and of the two men who suffered permanent total disability, the number of days for which compensation was allowed under the Ohio law for the accidents caus-

¹ Ohio Industrial Commission. Department of Investigation and Statistics. Report No. 25. Statistics of mines and quarries in Ohio, 1915. Springfield, 1916. 99 pp.

² In 1914 one such accident occurred to every 307,154 tons mined.

³ Exclusive of any additional expenditures for medical and hospital attention by employers who carry self-insurance and who are required to furnish medical and hospital care without cost to the injured person.

ing permanent partial disability, and the number of days actually lost from accidents causing temporary disability. Of 48 fatal accidents, 33, or 68.8 per cent, were caused by falls of stone, slate, and coal; for these a total of \$95,518.32 was expended in death benefits, medical and hospital and burial expenses—an average of \$1,989.97 per case.

Two of the accidents resulted in permanent total disability, and for these the commission paid out in compensation during the year \$1,246.10 and for medical and hospital services \$200. In one case the firm furnished medical and hospital service without expense to the employee. Payments will, of course, continue in both of these cases.

There were 67 accidents resulting in permanent partial disability, the total award being \$33,654,¹ or an average of \$502.30 each. The total number of days for which compensation was paid in these cases under the Ohio law is shown to be 23,167, or 64.47 years.

The total awards paid in 2,661 cases resulting in temporary disability was \$89,441.86,¹ but of this amount \$1,055 was paid for medical and hospital services in 680 temporary disability cases lasting 7 days or less, no compensation being paid in such cases. The average compensation cost of the 1,981 cases lasting more than 7 days was \$44.62 each. The total loss of working time, according to the report, represented by these 2,661 cases was 68,606 days, or 187.96 years. More than half (1,516, or 57 per cent) of these accidents resulted in disabilities of two weeks or more, while 28.5 per cent resulted in disabilities of five weeks or more. Of 2,098 for whom information concerning experience was obtained, 31.2 per cent had had experience of less than one year. As to nature of injury, 62.8 per cent were abrasions, bruises, contusions, crushes, cuts, lacerations, punctures, and scratches. The following table gives a summary of all coal-mine accidents for which awards were made by the commission during 1915:

NUMBER OF AWARDS, TONS MINED PER ACCIDENT, AND AWARDS MADE UNDER THE OHIO WORKMEN'S COMPENSATION LAW DURING THE YEAR 1915.

Result of injury.	Number of awards.	Tons mined per accident. ³	Payments made. ²	
			Amount.	Average.
Fatal.....	48	471,397	\$95,518.32	\$1,989.97
Permanent total disability.....	2	11,313,523	1,446.10	723.05
Permanent partial disability.....	67	337,717	33,654.00	502.30
Temporary disability.....	2,661	8,503	89,441.86	33.61
Total.....	2,778	8,145	220,060.28	79.22

¹ Exclusive of medical and hospital expenses paid by firms carrying self-insurance under the State plan.

² Based upon production of 22,627,046 tons.

³ Includes compensation, death benefits, and medical, hospital, and funeral expenses. The report makes no distribution of these amounts by result of injury, but, as indicated in the text on page 264, it does distribute the total according to the amount paid for compensation, death benefits, medical, and burial expenses.

Twenty-five pages of the report are devoted to statistics of fire clay, gypsum and iron mines, and limestone and sandstone quarries. No accident statistics are presented. The fire clay production of 93 mines was 2,049,664 tons. Of 1,094 wage earners for whom wage rate was reported, 419 (38.3 per cent) received between \$12 and \$15 per week, and 252 (23 per cent) received less than \$12 per week. The total pay roll was \$728,686; 62.2 per cent of the firms reported 48-hour weeks. The average number employed was 1,041 per month.

The production of the four gypsum mines in the State was 251,283 tons. The maximum employed in any one month was 408 in June. Approximately 70 per cent received less than \$15 per week.

Only 3,668 tons of iron were produced in 1915.

Ninety-four establishments reported a production of 9,133,678 tons of limestone; 92 establishments reported an average of 3,442 employed per month; approximately one-third of the establishments worked less than 150 days; of 4,785 wage earners for whom average wages were reported, 76.1 per cent receives less than \$15 per week; 68 establishments reported 60 as the normal hours of labor per week.

Sandstone, being sold by cubic feet, linear feet, square feet, and ton, the production reported by 52 firms could not be reduced to a common unit. The average employed per month by 50 firms was 2,054; 26 out of 49 establishments reported 60 as the normal hours of labor per week; of 2,427 wage earners, 82.9 per cent received less than \$15 per week.

TEXAS.

The report of the Texas Industrial Accident Board for the year ending August 31, 1916, consists of 10 pages almost entirely devoted to statistical data covering the operation of the workmen's compensation act for the 12-month period. It shows that 6,092 employers of labor have subscribed to the act since it became effective on September 1, 1913, with a total of 4,200 active subscribing employers on August 31, 1916. It is estimated that 200,000 employees are subject to the benefits of the act, while probably 6,000 more are subject to its benefits but not reported by employers. The number of accidents reported during the year was 34,669, there being 102 fatal accidents; the number of claims filed with the board was 13,803; the amount paid by insurance companies for compensation was \$389,324.73, and for medical services, etc., \$103,875.83, the total being \$493,200.56.

Employers are not obliged to subscribe to the act, but those who do subscribe to its provisions are required to report accidents of whatever kind or however trivial. Compensation begins on the

eight day after the occurrence of the accident, and for total disability is equivalent to 60 per cent of the average weekly wage, with a minimum of \$5 and a maximum of \$15 per week. Lump-sum settlements are not authorized, except in case of death or permanent total disability. The report states that fully three-fourths of those injured and receiving compensation could not have recovered compensation from employers under the law in force prior to the passage of the act.

CONFERENCE OF INDUSTRIAL PHYSICIANS IN PENNSYLVANIA.

The passage of workmen's compensation laws and the increasing employment by mercantile establishments and factories of their own full-time medical men have developed in medicine a new specialty known as the industrial physician. Upon him depends the health and welfare of the workers and the problems of industrial hygiene which he must meet bear an important relation to the efficiency of the plant. Since policies to be inaugurated in the interest of workers may vary materially with the nature of the work performed in a particular establishment, it becomes necessary for each industrial physician, if he is to broaden his knowledge of methods of protecting and caring for employees, to have opportunity to meet and consult with other industrial physicians in the hope that an interchange of ideas and experiences may be mutually helpful. This fact has been recognized by the Pennsylvania Department of Labor and Industry, which last year arranged conferences of industrial physicians, two of which, on February 17 and on May 18, were reported in the Pennsylvania Medical Journal for October, 1916, pages 1 to 63. At these conferences papers were read vitally affecting the interests both of employers and employees.

In his address of welcome at the first conference, Dr. J. B. McAlister, president of the Medical Society of the State of Pennsylvania, advised physicians to assume an attitude of friendly cooperation with the compensation board in the administration and application of the workmen's compensation law.

Dr. Elizabeth B. Bricker, of the department of labor and industry, spoke on asphyxiation and suffocation, giving a résumé of several of the methods in use for resuscitating patients "in order merely to open a discussion on this subject." This discussion developed a quite general sentiment in favor of the Schaeffer method, while some physicians seemed to have had success with the pulmotor and lungmotor.

The laws of Pennsylvania relating to industrial hygiene were reviewed by Dr. Francis D. Patterson, chief of the division of hygiene of the department of labor and industry. This paper provoked an

extended discussion as to the ultimate end of the physically defective in industry, the value of physical examination to determine fitness for employment, and the attitude of the compensation board toward certain questions that may arise under the act. The opinion seemed to prevail that the physically unfit should be employed, if at all, in work where he may earn a living for his family without endangering the lives of other workers.

In a subsequent paper on lead poisoning, Dr. Patterson declared that "of all the industrial poisons lead is the most productive of ill health by reason of the fact that there are more employees exposed to lead in some form than to any other industrial poison. The onset of poisoning is insidious, and therefore the worker does not know he has been affected until he presents the clinical evidence of a marked case of the disease." After indicating the three channels through which absorption may occur—the respiratory tract, the gastrointestinal tract, and the cutaneous—and the conditions which predispose to lead poisoning, the speaker stated that "there is no condition where the ounce of prevention is more important than the pound of cure than in lead poisoning. The collection of all dust and fume at its source will prevent the occurrence of poisoning, and this can be accomplished by proper exhaust systems and by the substitution of vacuum for dry sweeping."

"The workmen's compensation law as it affects the physician" was a paper presented by Paul N. Furman, chief of the bureau of statistics of the department of labor and industry, who explained the act and called attention to two provisions which seem to have been universally adopted: (1) The right of the employer to select medical attendants, and (2) a waiting period of from 10 to 15 days. Both of these provisions, he stated, were justified. Mr. Furman also stated that the section which probably has excited the most interest and comment on the part of the medical profession is that which makes it obligatory upon an employer to furnish reasonable surgical, medical, and hospital service during the first 14 days, unless the employee refuses such service. The discussion following took the form of questions bearing on the rights of employees, employers, and physicians under the act, which Mr. Furman endeavored to answer.

At the second conference, held on May 18, the delegates, numbering many more than attended the first conference, were welcomed by John Price Jackson, commissioner of labor and industry, who explained the operation of his department through its various divisions. This was followed by a paper by Dr. Alfred Stengel, of Philadelphia, whose topic was "Relation of extreme temperatures to the

efficiency of the workman." Dr. Stengel reviewed the experiments of scientists who have investigated the limits of temperature in which men can exist normally, calling particular attention to the observations of Dr. J. S. Haldane, who concluded that continuous hard work is impracticable where the wet-bulb thermometer shows a temperature above 78°, and that it is impracticable for ordinary persons to remain for long periods of time where the temperature is above 88°. From this the author concluded that impairment of efficiency must begin at a grade of heat lower than 78°, and that continued hard work, though endurable, would in the long run prove injurious.

Dr. J. W. Schereschewsky, of Pittsburgh, in discussing this subject, thought it quite possible that the high accident rate in Pennsylvania may be associated with the fact that coordination is diminished because of the constant exposure of the worker to extremes of temperature. He also thought that much of the high temperature could be avoided, even in plants where extreme heat is necessary, and emphasized the importance of adequate ventilation, proper water supply, good home conditions, and frequent use of baths. Other speakers urged the necessity of workers having plenty of fresh air while at work, but more particularly while asleep.

Dr. Frederick S. Crum, of the Prudential Insurance Co., read a paper entitled "Mortality from diseases of the lungs in American industry," in which he confined himself principally to a consideration of the apparent effect on mortality in certain occupations or groups of occupations which expose the workmen therein to different kinds of dust, the paper including statistics of the mortality experience of his company during the period 1907 to 1912, which may be summarized as follows:

MORTALITY FROM DISEASES OF THE LUNGS CAUSED BY EACH SPECIFIED KIND OF DUST, AS SHOWN BY THE RECORDS OF THE PRUDENTIAL LIFE INSURANCE CO. FOR THE PERIOD 1907 TO 1912.

Kind of dust.	Number.	Per cent.
Metallic.....	3,670	12.8
Mineral.....	4,336	15.2
Vegetable fiber.....	1,887	6.6
Municipal.....	10,789	37.7
Animal or mixed fiber.....	1,454	5.1
General organic.....	6,468	22.7
Total.....	28,604	100.0

It was stated that this 28,604 is 17.6 per cent of the total number of deaths (162,763) of all occupied males aged 15 years and over. It was also stated that in these six groups of occupations there occurred during the six-year period 7,943 deaths from pulmonary

tuberculosis, or 27.8 per cent of the aggregate mortality from all causes; that there were 3,330 deaths from respiratory diseases other than tuberculosis, or 11.6 per cent of the aggregate mortality from all causes; and that the mortality from tuberculosis of the lungs in the dusty occupations was 41.1 per cent in excess of the mortality from tuberculosis in the nondusty occupations. Dr. Crum took up in details the varied effects of the different kinds of dust on mortality from tuberculosis of the lungs and other respiratory diseases, stating that "metallic dust is probably, all things considered, the most hurtful," and concluding as follows:

The most effective method of contending with the excessive morbidity and mortality among employees engaged in dusty trades and occupations is undoubtedly by the method of more efficient ventilation. * * * If once standardized methods of efficient ventilation and dust removal are adopted, we may confidently anticipate a greatly reduced death rate among employees in these occupations in which excessive amounts of industrial dust are created, and with the reduction in the death rate there will, of course, be an even larger gain in the reduction in the amount of sickness and the general improvement in the health of the workmen. This will result in an increased productive power, so that the employers will reap a benefit which will largely offset any expenditure to which they may be put for the installation of the necessary dust-preventive devices.

The value of physical examination as a factor in the prevention of industrial injuries has come to be recognized quite generally by industrial physicians and employers. How this has been applied in one industry was told by Dr. J. B. Lowman, chief surgeon of the Cambria Steel Co., who gave the result of an examination of 12,302 men. This examination revealed the following facts:

RESULT OF PHYSICAL EXAMINATION OF 12,302 EMPLOYEES OF THE CAMBRIA STEEL CO.

Nature of defect.	Number.	Per cent.
Eyes, minor and major defective.....	1,318	10.7
Ears, minor and major defective.....	731	5.9
Decayed teeth.....	1,818	14.8
Deformities.....	1,213	9.9
Amputations.....	185	1.5
Varicose veins.....	344	2.7
Chest: Heart and lung diseases.....	158	1.3
Abdomen: Hernias and open canals.....	2,007	16.3
Miscellaneous.....	137	1.4
Total.....	17,911	164.5

¹ Although it is not stated, it may be presumed that the remaining employees were found to be without defects of any kind.

Dr. Lowman at the conclusion of his paper summed up the advantages following physical examination of employees:

1. Safety first and prevention of accidents. The number of preventable accidents will decrease as the physical standard is increased.
2. The importance to the employer of knowing the condition of his men.

3. That suitable employment is found for those unfortunate enough to have physical defects which debar them from their normal vocations.

4. The rejection of the unfit, but not without free medical consultation, and recommendation for their regeneration.

5. Economic value to the company because of the greater freedom from falsified claims and freedom from indemnities and compensation required in accidents due to impaired vision, hearing, and other disabilities of the workingman, who injures himself as well as his fellow workmen.

As a result of these examinations the following suggestions present themselves:

1. That it is of vast importance to the employers to know the condition of their employees' health and physical defects.

2. That, wherever possible, those who are unfortunate enough to possess any gross physical defects that will debar them from their regular vocation be given suitable employment to fit their cases.

3. That all open canals, especially those where a strong impulse or a slight bulging is produced, should be classified with hernias, and treated as such, as it has been demonstrated that this condition is more apt to cause trouble than those in which men know that they have a hernia.

4. That the employers should realize that in conducting these examinations it is for their interest as well as that of the employees that this department is being conducted.

5. That the number of preventable accidents will decrease as the physical standard is increased.

The discussion which followed emphasized the close relationship which exists between physical examination and the increased efficiency resulting therefrom and the prevention of accidents or injuries to workmen. Dr. Schereschewsky suggested the necessity of considering the status of those who are rejected on account of physical examination, a question which must be met as the practice of making physical examinations becomes more universal. This condition, he believed, is an argument for the very careful consideration of health and invalidity insurance, because these rejected workmen must be taken care of.

In his paper on "What constitutes 'reasonable' surgical, medical, and hospital services under compensation act," Dr. John M. Baldy, president of the Bureau of Medical Education and Licensure of the State of Pennsylvania, expressed the opinion that—

"Reasonable" minimum service to an injured person would be at once to transfer the patient (the wounds having been untouched by anyone): First, to an incorporated hospital; or second, to a physician licensed to practice medicine in the Commonwealth of Pennsylvania; or, third, to administer first aid at the place of injury. First aid having been rendered at the place of injury, the service would be "reasonable" provided the injured one be referred, in the case of slight injuries, first, to an incorporated hospital; or second, to a licensed physician; or third, to a central point especially equipped by the employer for care of accident cases, to consist of not less than two rooms. In the case of severe injuries: First, to an incorporated hospital; or second, to a licensed physician.

The concluding paper was read by Dr. C. A. Lauffer, the title being "Inguinal hernia: viewed as an anatomical defect." In this paper the position was taken that—

As hernia is due to an anatomical defect nine hundred and ninety-nine times out of a thousand, and is truly traumatic in less than one case out of a thousand, it is clearly a misapplication of compensation funds to pay for hernia as an accident. The disposition to hernia, and the aggravation of existing hernia as well, is an individual hazard. To transfer this hazard from the individual to the industries employing such individuals, by legislative enactment, is unfair and unreasonable. Should the several States inaugurate a more universal plan of disability insurance, covering both sickness and accident, the employee paying half and the employer paying half, then the employee would be justly protected for hernia, and other maladies due to anatomical defects, which are properly classified under "sickness."

GASOLINE ENGINE EXHAUST-GAS POISONING.¹

BY DR. R. P. ALBAUGH, ACTING DIRECTOR, DIVISION OF INDUSTRIAL HYGIENE, OHIO STATE DEPARTMENT OF HEALTH.

The gasoline motor and the poorly ventilated garage have brought with them instances of prostration and even death induced by intoxication from noxious gases emitted as exhaust gases from gasoline engines. Whenever an explosion is of moderate intensity and combustion incomplete, these gases may be formed in amounts far in excess of the amounts we have learned to consider the physiological standards of endurance. Burrell, Schumacher, Apfelbach, and others, have shown by analyses that the per cent of carbon monoxide in exhaust gases varies from 2 to 25—averaging about 9 per cent—while that of carbon dioxide varies from 3 to 24 per cent, both depending upon the quality of carburation and the bore and stroke of the engine. Haldane states that 0.05 per cent carbon monoxide in pure air is just sufficient to produce in time very slight symptoms of poisoning in man; that 0.1 per cent may cause a slight headache or palpitation of the heart in an hour or less; and that 0.2 per cent is very dangerous. Burrell found in experiments upon himself that he became very sick for eight hours after exposure for 20 minutes to air containing 0.25 per cent carbon monoxide. It is evident that great dilution of these gases must be brought about in order to render them harmless.

The Ohio State Department of Health has received a number of complaints and reports of exhaust-gas intoxications, and in most instances investigations of these occurrences have been made by

¹ Paper read at the forty-fourth annual meeting of the American Public Health Association, section on industrial hygiene, Cincinnati, Ohio, Oct. 24-27, 1916. A brief account of the meeting of this section is given in the MONTHLY REVIEW for December, 1916, pp. 729-731.

members of the department. In one instance a man whose son was employed in the engine-testing department of an automobile factory complained that his son and three other young men had suffered from dizziness and extreme weakness at various times, and on one occasion were forced to be taken from the room, at which time they were seized with severe attacks of vomiting, together with vertigo, ringing in the ears, headache, general weakness, and a slow, weak pulse. They were taken into the open air and gradually recovered and were able to return to work the second day thereafter. A number of cases of sudden death have also been reported, occurring, in most instances, in small private garages with windows and doors tightly closed. The term "petromortis" has been frequently used by the press as the cause of death in cases of this kind.

Probably the most striking instance of exhaust-gas poisoning called to our attention occurred in a hotel in a small town in western Ohio. The building was a two-story structure with a private electric plant, consisting of a generator and a 14-horsepower gasoline engine located in a small room in the basement. From the engine a 3-inch exhaust pipe led out underground into an alley to a silencing drum made of two 24-inch sewer tiles. From this drum the 3-inch pipe continued and came to the surface about 20 feet from the building. The engine was operated by the night clerk, who usually went to the engine room two or three times in an evening to see that oil cups were filled and everything running smoothly, and at 12 o'clock nightly he stopped the engine and closed the building. On the occasion of one visit to the engine room he was seized with extreme dizziness and a great general weakness, especially noticeable in the lower extremities, and was forced to sit down and rest several times on the steps leading from the basement. He immediately sought the open air, and in the course of half an hour had fully recovered. This same condition was repeated to a greater or less degree each time he visited the basement during the next few nights, and, becoming alarmed about his condition, he consulted a physician, who assured him that he had no heart affection or other organic trouble in so far as he was able to discover. About two weeks after he first noticed his trouble he went to the engine room at 12 o'clock, as usual, and stopped the engine. While in the basement he became so dizzy that he could not stand, and was forced to crawl on his hands and knees to the first floor. In attempting to ascend the first flight of stairs leading to the second floor he became so dizzy, weak, and short of breath, and a throbbing headache became so severe, that he called for help and promptly lost consciousness. There were 19 other persons in the hotel, and as they

came into the corridor—all on the second floor—they also became so weak and dizzy that they were forced to either sit or lie down. One man was able to reach a telephone and summon a physician, who decided that they had eaten poisoned food, and accordingly administered warm milk and other emetics, and later a large dose of epsom salts. All complained of practically the same symptoms, *viz*, dizziness, general muscular weakness, throbbing temporal headache, palpitation, and shortness of breath. Two were in a comatose condition, four complained of nausea, while in two instances there were evidences of relaxation of the sphincters. Although some were rather indisposed for a day or two, all recovered in a short time.

The following day an investigation was made of the cause of the wholesale poisoning. The gasoline engine was started and the five persons present in the engine room were conscious of dizziness, weakness, and palpitation within a few minutes after the engine was started. The exhaust pipe was dug up and it was found that one sewer tile had given away and the silencing drum was almost completely filled with water and dirt. With an almost total occlusion of the exhaust pipe, practically the whole charge of gas was forced back into the small, poorly ventilated basement room, from which it found its way through the open stair door to the entire building.

Carbon monoxide, of course, was responsible for these cases of intoxication, as it is for all cases of exhaust gas poisoning. Being lighter than air, it permeated the building rapidly when the door was opened and reached the second floor in such concentration as to be poisonous in a very few seconds, notwithstanding the dilution that necessarily took place as the gas traveled through the three rooms on the first floor. Carbon monoxide is in no way a new poison, but the advent of the gasoline engine as a means of power and locomotion brings with it many curious opportunities for its poisonous effects.

The first consideration in the prevention of poisoning by gases emitted from the engine is adequate dilution. Authorities have agreed that the concentration of carbon monoxide in pure air must be kept below 0.05 per cent if poisoning is to be prevented. Thus, if an ordinary gasoline motor running at moderate speed is capable of emitting 2.5 cubic feet of carbon monoxide per minute, approximately 1,500 cubic feet of pure air per minute would be required to keep the concentration below the danger mark. Gasoline engine manufacturers, motorists, and others should keep this in mind in considering the question of ventilation of workrooms, garages, etc. The fact that cases have been reported to us of prostration in large factory rooms in automobile factories, would indicate that the danger is not confined to small garages, and the need of a thorough system of ven-

tilation is evident. The odorless, colorless, and tasteless properties of the gas make unanticipated repeated exposures possible, and warrant wide recognition in the interests of hygiene.

DANGERS CONNECTED WITH THE SPRAY METHOD OF FINISHING AND DECORATING.¹

BY DR. R. P. ALBAUGH, ACTING DIRECTOR, DIVISION OF INDUSTRIAL HYGIENE, OHIO STATE DEPARTMENT OF HEALTH.

The spray method of applying varnishes, enamels, shellacs, lacquers, and practically every kind of finishing and decorating material brings with it the increased dangers of poisoning by the various hydrocarbons that are almost constantly used for quick drying and even spreading, as well as lead and other poisons used in the composition of the substances applied, unless unusual precautions are taken against the inhalation of these products by workers. The spray, or compressed-air system, is gradually supplanting the old methods of dipping and brushing, resulting in a better quality of work, greater speed and economy, a higher degree of efficiency, and, when properly equipped and operated, a greater degree of freedom from occupational poisoning should result. Unfortunately, during the period of development of the spray method, all effort was devoted toward perfecting the nebulizer in order to turn out a better finished product, while little or no effort was directed toward the removal of nebulous clouds of poisonous fumes and vapors which enveloped the person of the operator. As a result, we have seen a number of cases of poisoning by naphtha, lead, etc., in operators of these machines, and a number of others have been reported to us.

On September 13, 1915, our attention was called to the death of a youth the previous day, the cause of death being assigned as "Myocardial degeneration, probably caused by naphtha and turpentine poisoning." We called on the physician having charge of the case, who stated that the patient had first consulted him at his office six days previously. He gave his age as 18, single, American, and occupation as a sprayer in a filler and varnish room in a factory. He complained at that time of great weakness, periods of nausea, loss of appetite, tingling of extremities, constipation, and hemorrhagic spots over the body. He was very anemic and had lost about 18 pounds in the past six months. The systolic blood pressure was found to be 85, temperature 97.2, and pulse 69, weak and irregular.

¹ Paper read at the forty-fourth annual meeting of the American Public Health Association, section on industrial hygiene, Cincinnati, Ohio, Oct. 24-27, 1916. A brief account of the meeting of this section is given in the MONTHLY REVIEW for December, 1916, pp. 729-731.

On the second day thereafter the patient was compelled to take to his bed with the above symptoms exaggerated. The systolic blood-pressure was found to be only 75, the temperature below 94 (it could not be recorded accurately because the thermometer was graded down only to 94), pulse 90 and very weak and irregular. The urine was rather cloudy, specific gravity 1.022, acid in reaction, contained a trace of albumin, many hyalin casts, a few finely granular casts, and a few cylindroids. Blood count: Erythrocytes—3,500,000; leucocytes—12,400; polymorphonuclears—78.6 per cent; small mononuclears—16.4 per cent; large mononuclears—3 per cent; and eosinophiles—2 per cent. Spinal puncture revealed nothing. His condition grew steadily worse and on the fifth day he passed into a delirium and died the following day. An autopsy was refused.

On the occasion of one visit by the physician to the patient's home, he encountered three young men who came to visit the patient, and who were employed in the same department with him. They all described symptoms very similar to those of the patient, except in a milder form, and signified their intention of leaving the establishment.

As is customary in such instances, we called at the establishment where the patient had been employed and learned that for eight months he had been a sprayer in the varnish room. Each sprayer was covered by a large hood or cabinet of sufficient size to allow the presence of the article to be varnished and, indeed, the person of the operator, should he so choose. Each hood was equipped with an exhaust pipe with good exhaust. However, when the spray was directed against a flat surface, it would roll back and completely envelop the upper part of the operator's person, particularly if he were not careful of his position. It was observed that the workers paid little attention to being included in the escaping spray at frequent intervals, although such was not apparently necessary to perform the work. It was stated that a substance was used which contained naphtha and there was a very perceptible odor of "quick driers" present, suggestive of a turpentine and benzine combination. No respirators were worn nor were any adequate instructions given or enforced supervision concerning the exposure to the spray.

There are approximately 2,500 sprayers in use in Ohio, and in only about 25 per cent of them have the necessary precautions been taken to safeguard the health of the operators. The more common faults and imperfections which we have found are noted below.

1. Cabinet provided but exhaust absent or insufficient.
2. Good exhaust, but cabinet too shallow.
3. Good exhaust, but poorly located in box.
4. Fan located too far from box.
5. Exhaust inlet too small.

6. Pipe occluded by accumulations of paint, varnish, etc.
7. Cabinet with flat back or top where exhaust inlet is located. It should be conical to provide uniform draft.
8. Tendency to apply spray at right angle to flat surface, causing it to roll back, enveloping operator.
9. Necessity, in spraying long objects, of getting out of range of the exhaust.
10. Inclination on part of workers to enter cabinet and sit on stand while spraying in order to rest after constant standing.
11. Ignorance of the presence of poison and dangerous character of the work.
12. Spraying promiscuously about the workroom away from the exhaust box, as in "touching up" or trying the sprayer, etc.
13. Defective vision of operator.
14. Poor illumination of work space.

As the spray method of applying fillings, varnishes, colors, and paints, dissolved in various hydrocarbons for quick drying and even spreading, is becoming very extensively used, especially in factory work, and as the fine nebular clouds produced give opportunity for unusual diffusion of the volatile substances present, nearly all of which are poisonous, employers should adopt unusual precautions against the inhalation of these products by workers. The installation of confining cabinets, exhaust pipes, etc., is not sufficient. The workers themselves must be strictly supervised in their work and their tendency to expose themselves to the spray. Undoubtedly many cases of increasing fatigue and exhaustion have developed among this class of workers, causing most of them to quit the employment. On the other hand, some who have remained have passed into the purpuric and later moribund condition here described, with fatal consequences.

MUNITION-PLANT POISONS.¹

It is interesting to note the importance recently attached to the manufacture of munitions of war, particularly as respects the dangers to workmen following employment on processes involving the use of elementary poisons and poisonous compounds, some of which were infrequently used prior to the European war. In a paper on "Munition-plant poisons," read by Archie Rice, of the International Steel & Ordnance Co., Parlin, N. J., at the meeting of the American Public Health Association in October, 1916, it was stated that "the possibility of the workmen becoming poisoned exists in the form of fine

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dust and of the invisible vapor given off in the processes of manufacture and during the work of loading the projectiles with the bursting charge. Either the dust or the vapor or both of them may be absorbed into the human system and get into the tissues through the pores of the skin, through the mucous membrane of the nostrils, of the mouth, and of the throat, and possibly through the lungs." In this connection particular reference was made to trinitrotoluol, picric acid, and fulminate of mercury which, with other nitro compounds (except guncotton and nitrate of ammonia) are poisonous. All affect the heart; picric acid is a more severe poison, but is less dangerous to workmen because "it causes a puckering, bitter taste in the mouth," to avoid which "workmen will keep their mouths shut and thus unconsciously protect themselves." Trinitrotoluol is absorbed into the system more slowly. In loading it into high-explosive shells it is either packed in dry or poured in. The dry method is all dust, while the pouring process implies both dust and fumes. The following excerpt from the paper gives the writer's personal observation, covering eight months, at a munition plant engaged in loading 3-inch high-explosive projectiles with trinitrotoluol, using the pouring method.

During that period of eight months approximately 500 different individual workmen came, by the nature of their employment, into regular close manual and physical contact with both the dust and the fume of trinitrotoluol. Fifty of those workmen had to receive medical attention from a physician because of the effects of the trinitrotoluol upon them. Two of them died. The experience of this one plant may be considered typical of what has probably happened in all the others, both in Europe and in the United States. In the United States about 3,000 men are regularly employed in trinitrotoluol work in connection with munition contracts. But the newness of the industry and the popular fear of explosive factories as undesirable places of employment have tended to give the trinitrotoluol departments rather a transient class of labor, such as is not generally trained or careful in hygienic habits. A large percentage of such men remain but a few weeks. So great is the tendency of this unsettled class to change that probably it is fair to assume that in a year's period of the war as many as 20,000 different men in the United States do some work in trinitrotoluol. Maybe twice that number of different individuals are employed in trinitrotoluol work in Europe in a year.

In its serious effects upon the system, trinitrotoluol generally follows a regular course, it was stated.

At first it accelerates the heart action when some of it has penetrated the tissues and reached the blood. Next there is a clogging up of the pores, accompanied by strenuous efforts of the tissues to absorb the poison and to get rid of it through the digestive tracts. Then comes, with the clogged pores and the accelerated heart action, an increased blood pressure, often accompanied by an obvious purpling of the lips. * * *

One's first experience with imperceptible trinitrotoluol dust is a slight, but distinctly noticeable, bitter taste in the mouth. Longer exposure than the first casual experience is often followed by severe headache. There may also come

an intense, quinine-like bitterness in the mouth, persisting for perhaps 24 hours and accompanied by some headache and nausea, with white, frothy vomitus. These are usually the effects upon the occasional visitor, with a later tendency toward a degree of immunity.

Attention was called to the fact that there is authority for stating that while trinitrotoluol is poisonous, it is deadly in its effect only when taken into a system using alcohol. "If a workman will not drink alcoholic beverages, will bathe frequently, eat wholesome food, and take ordinary care of himself there will be no serious result."

For the protection of workers the speaker suggested the use of hoods and suction devices to draw off the fumes and dust; that floors be kept clean; that there be abundance of ventilation; that workmen be provided with gloves and overalls and with respirators; and that sanitary drinking fountains and convenient hot and cold showers be furnished.

All of this information would be of but transient interest if trinitrotoluol making and handling were probably to lapse after the war into a comparatively small industry. But it may grow in the United States to twice the magnitude of its war-time size. Toluol is one of the numerous by-products of the refining of coal tar. Wherever dyes are made in large quantities there toluol is also produced. And if dye making attains large proportions in the United States and toluol becomes relatively cheap, then trinitrotoluol could be used to the extent of 200,000,000 pounds annually as a commercial explosive to be combined with nitroglycerin or with nitrate of potash. It could not be used alone in mines and tunnels where ventilation is poor, as it emits at the moment of explosion a gas that would kill workmen in confined spaces. It has its value as a nonfreezing dynamite and as a high explosive that is comparatively safe against shock and rough handling. If it be extensively manufactured in the United States after the war, perhaps 4,000 workmen would be regularly employed in the manufacture of trinitrotoluol.

All the factories at present making it are located in New Jersey, in adjacent eastern Pennsylvania and northern Delaware, in the northern part of Wisconsin, and in the central part of California. About two-thirds of the workmen are employed in the eastern section.

MODERN CHEMICAL INDUSTRIES AND PUBLIC HEALTH.¹

A paper bearing the above title was read by Dr. Francis E. Fronczak, health commissioner, Buffalo, at the meeting of the American Public Health Association held in October, 1916. The subject matter of the paper was limited to a consideration of the effects of certain chemical industries on the health of workmen and their relation to the public health in general, the author basing his facts upon an investigation of 17 plants manufacturing, by electrical processes, such chemicals as chlorine, caustic soda, bleaching powder, chro-

¹ Paper read at the 44th annual meeting of the American Public Health Association, section on industrial hygiene, Cincinnati, Ohio, Oct. 24-27, 1916. A brief account of the meeting of the section appears in the MONTHLY REVIEW for December, 1916, pp. 729-731.

mates of potash and soda, chlorates, and metallic elements such as sodium and phosphorus. The deleterious conditions accompanying productions throughout the industry are due to irritating and corrosive dusts, which in most of the plants visited are not effectively carried off; to noxious gases against which workmen are not sufficiently protected but which are, on the contrary, purposely allowed to escape to the outer air; and to highly heated compounds. These conditions, it was suggested, are due to the fact that the "commercial end of production has minimized a proper consideration of the effect of deleterious substances escaping from the works."

All of the factories visited claimed that their men were not injured by escaping products, pointing to the condition of some who have been with them for many years. The speaker maintained that this is not evidence that all the men who have worked there have been free from the effects incident to the work; as a matter of fact, the physical effects of these agencies on workmen and upon those who live in the community are too well known to need further evidence in confirmation thereof. Legislation in the interest of workers has not been effective because its enforcement has been perfunctory, but "in general, the attitude toward employees is the conservation of their health in the interest of efficiency," for "it is becoming more appreciated that the well-being of workmen means efficiency."

Experience abroad, it is stated, shows that the prevention of damage from chemical works operated by electricity presents no problem which can not be handled, and the workers could be protected by (1) physical examination to determine fitness for employment; (2) provision of first-aid equipment and a physician in charge; (3) wearing of goggles where required; (4) a system of dental examination; (5) sanitary washing facilities; (6) the installation of an efficient exhaust system where dust is generated, and provision for carrying off gases and fumes.

In conclusion the opinion is expressed by the author of the paper that control should be vested in the National Government rather than in local authorities, which shall prescribe a standard of comprehensive requirements systematically supervised and plants thoroughly inspected by men technically qualified.

CASES OF FATAL POISONING BY GASES AND FUMES.¹

As the title implies, the paper by Dr. Thomas F. Harrington, Massachusetts deputy commissioner of labor, on "Cases of Fatal

¹ Paper read at the 44th annual meeting of the American Public Health Association, section on industrial hygiene, Cincinnati, Ohio, Oct. 24-27, 1916. A brief account of the meeting of this section is given in the MONTHLY REVIEW for December, 1916, pp. 729-731.

Poisoning by Gases and Fumes," read before the American Public Health Association in October, 1916, was a record of instances of industrial diseases reported to the Massachusetts Board of Labor and Industries.¹ A table was presented in this paper showing 42 cases of poisoning, 13 resulting in death, distributed as follows:

CASES OF GAS AND FUME POISONING REPORTED TO THE MASSACHUSETTS BOARD OF LABOR AND INDUSTRIES.

Industrial poison.	Number of cases.	Number of deaths.
Trinitrotoluene.....	17	4
Acute phenol.....	1	1
Picric acid.....	2	.....
Copper nitrate.....	1	1
Nitrous and sulphuric fumes.....	2	1
Sulphuric fumes.....	1	.....
Acute nitrobenzol.....	1	1
Acute benzol.....	2	1
Chronic benzol.....	5	3
Sulphur dioxide.....	1	1
Sulphuretted hydrogen.....	2	.....
Carbon monoxide.....	4	.....
Carbon dioxide.....	3	.....
Total.....	42	13

The speaker took up each of these groups separately, dealing only with the fatal cases, and at the end of the paper appended a report of all the cases noted above.

Trinitrotoluene.—A marked characteristic of this group was the delayed onset of fatal symptoms and the long interval of apparent good health between the time of poisoning and the serious symptom. The symptoms varied somewhat in the different cases, but included pallor, dermatitis, general weakness, loss of weight, nausea, coughing, palpitation, headache, vertigo, hallucinations, and low hæmoglobin. Autopsy showed edema of lungs due to gas poisoning.

Acute phenol.—Ringing noises in the ears, dizziness, disturbed vision, air suffocation, hysteria.

Nitrous acid gas.—Cyanosis, dermatitis of arms, general weakness, loss of weight, acute arthritis, nausea, dyspepsia, constipation, pulse 90, tremor, twitching, mental disturbance, visual disturbance, conjunctivitis, tinnitus, progressive deafness.

Copper nitrate.—Nausea, vomiting, cough, dyspnoea, ulceration of mucous membrane, cyanosis, pulse 160, headache, paralysis of right arm and leg, mental confusion, irritation of nose, throat, and bronchial membrane. Autopsy showed edema of lungs, broncho-pneumonia; clot on right side of brain with embolus at top of left motor area, punctate hemorrhages in corpus callosum, and a massive hemorrhage size of egg in left parietal region.

¹ Dr. Harrington did not indicate in his paper the period covered by this report.

Acute nitrobenzol poisoning.—Paleness, cyanotic about lips, dizziness and mental confusion, vomiting, Cheyne-Stokes respiration, slow, weak pulse. Blood showed methæmoglobin. Later convulsions and coma developed, followed by death.

Acute benzol poisoning.—No symptoms given. Man overcome and efforts to resuscitate him failed. No autopsy.

Chronic benzol poisoning.—The three cases noted in this group were described quite fully; they occurred in a tire-making factory where benzol was used as a cement. Tables were presented by Dr. Harrington showing the blood record in each case. As typical of the effects of chronic benzol poisoning the history of one case may not be out of place:

Man, 33 years of age, had worked in the rubber industry since 1907. On April 20, 1915, he transferred to the tire-building department. In November, 1915, he began to have severe attacks of headache, often lasting three days at a time. During the winter he had sore throat and head colds almost continuously. In March, 1916, he began to spit blood, especially after eating, due to spongy, bleeding gums. This continued almost daily and later, in March, he noticed bluish-green spots on left thigh, followed in a few days by similar spots on left arm. These hemorrhagic areas soon spread to various parts of the body. On May 3 he gave up work on account of extreme weakness and dyspnea on slight exertion. On May 3 had a severe nosebleed, followed by a similar attack on May 7, when he was admitted to the hospital. Physical examination showed spongy bleeding gums, pale mucous membrane of throat and conjunctiva, ulceration in posterior nares. Spleen not palpable. Knee jerks present and equal. No Babinski, no ankle clonus. Family history and personal history free from puerpera and hemophilia. Headache, vertigo, and visual disturbance. * * * Transfusion of 10 ounces of blood followed by uncontrollable epistaxis. The man continued to fail. Nosebleeds frequent, severe, uncontrollable. Gums spongy and bleed on least irritation. Headache, vertigo, dizziness, restlessness, delirium, talkative, loss of power of arms and legs, coma, convulsions, and death, May 18.

Sulphur dioxide.—Cough, dyspnœa, suffocation. Autopsy showed marked irritation of respiratory tract, edema of lungs, marked congestion of the liver, spleen, and kidneys; bright red eruption on the elbows, marked cyanosis; absence of carbon monoxide, no cyanogen, slight amount of carbon dioxide.

Dr. Harrington thus concluded his record of cases of fatal poisoning by gases and fumes:

The State board of labor and industries has formulated a tentative set of rules to protect workmen engaged in the manufacture of benzine derivatives, aniline compounds, explosives, and other processes in which poisoning gases and fumes are a necessary part of the processes. Rules have also been enacted governing the use of salamanders in building operations—a fruitful source of carbon monoxide and dioxide poisoning.

I can not help feeling that the cases of gas and fume poisoning that have been reported in this paper are but typical of what is happening in many States to-day. We have become so obsessed with the germ theory of disease that we close our eyes and mind to even the possibility of any other agent.

EFFECT OF ATMOSPHERIC CONDITIONS UPON FATIGUE AND EFFICIENCY.

BY C. E. A. WINSLOW, PROFESSOR OF PUBLIC HEALTH, YALE MEDICAL SCHOOL, AND CHAIRMAN NEW YORK STATE COMMISSION ON VENTILATION.

The fitting together of the man and the job is one of the most important problems of modern industry. A correct solution requires, on the one hand, a study of the task, with a view to such modifications as may make it easier of performance, and, on the other hand, as Prof. Lee has pointed out, a careful consideration of the physiological machine and its capabilities, with constant reference to the time for which the work is to be continued as a factor in securing efficient performance with a minimum of fatigue.

Fatigue and efficiency depend, however, not merely on the man and the task but also on the conditions under which the task is performed and those which have affected the worker during a preceding period. The potentialities of a given workman on a given day will be influenced by the meals he has eaten on the day before, by the exercise he has taken, by his hours of sleep, and by his frame of mind when he comes to work. His actual performance will be largely controlled by the atmospheric conditions and lighting of the workroom, by its physical order and its psychological atmosphere.

I desire in this discussion to call your attention to the great but commonly unrecognized importance of one of these environmental factors in efficiency—the physical condition of the atmosphere of the workroom.

Our knowledge of the relation between air and health has made remarkable and almost revolutionary progress during the past 20 years. In 1896 the Smithsonian Institution published a brochure upon "The atmosphere in relation to human life and health," by F. A. R. Russell, vice president of the Royal Meteorological Society and fellow of the Sanitary Institute of Great Britain, which is a good example of the unfounded opinions which so recently ruled in this field of sanitary science. The emphasis is wholly chemical and bacteriological. "The deficiency of oxygen and excess of carbonic acid, which are common to nearly all rooms, schools, churches, theaters, and workshops where many persons are gathered, are very favorable not only to the spread of various infectious diseases but to the maintenance of a number of minor ailments; and where the exposure to foul air is prolonged, as in workshops, offices, and mills,

to a continued depression of vitality," says Mr. Russell. And, again, "The spreading, infectious, or epidemic diseases in the animal world and in mankind depend to a very great extent upon aerial influences."

Much water has passed under the bridges since 1896. We know to-day that—

1. The changes in oxygen and carbon dioxide content which take place in the worst-ventilated schools, theaters, and work places which have ever been studied (excepting bottling works, breweries, and other places where carbon dioxide is formed or used in the industrial process itself) are of a magnitude far too small to exert any harmful physiological effects whatever.

2. The organic substances which give a stale odor to the air of crowded rooms may perhaps exert a reflex effect on appetite and hence on the consumption of food, but otherwise they have not been shown to be poisonous or to exert any harmful effect. The liberation by industrial processes or imperfect combustion of poisonous gases and fumes, such as carbon monoxide or wood alcohol, may, however, be of serious importance in special cases.

3. The air is not a carrier of disease germs, except in so far as it may be locally polluted by considerable clouds of infected dust or by the spray discharged from the mouth in coughing, sneezing, or loud speaking for a few feet in front of an infected person.

4. Hard metallic or mineral dusts, such as are produced in many industrial processes constitute a very real danger to health from their injurious mechanical effects upon the respiratory tract, which definitely favor the development of tuberculosis and other respiratory infections.

5. The most far-reaching and important influences of the atmosphere upon health are due not to chemical or bacteriological factors but to the physical condition of the atmosphere itself. The sensations experienced in a badly ventilated room and the serious effects which such a room exerts upon health and efficiency are primarily due to the warmth and stagnation of the air and to its high humidity. The phenomenon, as Prof. Lee has so well said, is "physical and cutaneous, not chemical and respiratory"; overheating is the most serious aspect of underventilating.

It seems strange to-day that sanitarians should have gone so far afield in the search for mysterious organic emanations, "anthropotoxin" and "morbific matter," when the thermal explanation of the effects of bad air lay so close at hand.

The well-known influences of climate and season furnish broad and telling evidence of the influence of temperature on human efficiency. Prof. Ellsworth Huntington, in his remarkable book on *Civilization and Climate*, has made a detailed study of the develop-

ment of civilization in different parts of the world in relation to climatic conditions and finds a striking correspondence. His ideal climate is one with an average mean temperature of 15°C . (59°F .), and a range between a mean of -7°C . (19°F .) for the coldest month and 23°C . (73°F .) for the warmest month, and at least 20 storms a year, giving coolness combined with the stimulus of change. The areas where we should expect human energy to reach a maximum according to this criterion are western Europe and eastern North America, with central Europe, more western North America, Japan, New Zealand and the tip of southern South America next in order. With the exception of the latter region, for which the climatological data are imperfect, these are precisely the points where civilization reaches its highest point, while the warmer countries and the very cold countries form belts of retarded human development.

Prof. Huntington's studies of the effect of season upon the productivity of industrial workers provide evidence which is even more clearly significant and more directly in line with the subject which we have immediately in hand. He obtained detailed information as to the weekly earnings of operatives employed on piecework in Connecticut and Pittsburgh factories, in North Carolina and Georgia cotton mills, and in carpenter shops and cigar factories in Florida. None of the trades were essentially seasonal in nature yet the curves show in practically every case two maxima of efficiency in spring and fall with minima in winter and summer. In the north the winter decline is very marked and that in summer less noticeable. In North Carolina and Georgia the two minima are about equal, while in Florida the winter decline is insignificant and that of summer very clearly marked. A mean outdoor temperature of 15.5° to 18°C . (60° to 64°F .) seems in all cases to be most favorable for maximum industrial efficiency.

These figures, it should be noted, relate to general outdoor conditions, not to those which exist in the factory itself. Still more direct evidence of the immediate relation between air temperature and efficiency is furnished by the experiments which have been carried on by the New York State Commission on Ventilation during the past three years.

In these investigations over a hundred different subjects, both men and women, were placed for periods approximating a day or a half day of factory work under accurately controlled atmospheric conditions, maintained in specially constructed experimental rooms at the College of the City of New York. They were given physical and mental tasks of various kinds and in some experiments they were served a standard luncheon while in the rooms and their appetite measured by the amount of food eaten. Exhaustive physiological

and psychological observations were made of their bodily condition, and their efficiency in both mental and physical work was accurately measured.

These experiments showed that stale rebreathed air containing 20 parts or more of carbon dioxide and all the organic and other substances commonly present in such air had no harmful effect on any of the physiological conditions studied, nor on the power or inclination to do mental or physical work, nor even on the comfort of the subjects as indicated by their average vote, provided the temperature was not allowed to rise as it would generally do in such a room under ordinary conditions. There was, however, a slight but distinct diminution in the appetite for food in the stale air.

On the other hand warm air, whether stale or fresh, produced distinct and clearly marked physiological reactions. At a temperature of 24° C. (75° F.) with 50 per cent relative humidity the rectal body temperature was 0.2° C. higher and at a temperature of 30° C. (86° F.), with 80 per cent relative humidity, it was 0.5° C. higher than at 20° C. (68° F.), with 50 per cent relative humidity. The reclining pulse rate was 5 beats higher, and the standing pulse rate 12 beats higher at 24° C. (75° F.); the reclining pulse rate 8 beats higher and the standing pulse rate 17 beats higher at 30° C. (86° F.) than at 20° C. (68° F.). The systolic blood pressure was not affected at 24° C. but was decreased by 2 mm. reclining and by 7 mm. standing at 30° C. The diastolic blood pressure, reclining, was 5 mm. lower at 24° C. and 10 mm. lower at 30° C. while the figure for the standing position was the same at 20° C. and 24° C. but was 7 mm. lower at 30° C. The Crampton value, an index of the general tone of the vasomotor system obtained from the relation between the change in blood pressure and heart rate on passing from a reclining to a standing posture was 58 at 20° C., 53 at 24° C., and 36 at 30° C., indicating a progressively less efficient condition of the circulation with increasing temperature.

The power to do either mental or physical work when concentrating for a short period under a strong stimulus was not diminished in these experiments even by the extreme condition of 30° C. (86° F.) with 80 per cent relative humidity. This coincides with practical experience for we are all aware that heat, unless very extreme, is no hindrance to absorbing intellectual work and no bar to a good game of tennis.

The effect of heat upon efficiency, unless the influence is a prolonged one, is exercised rather upon the will than on the power to work. Our subjects in some cases were asked each day to vote as to the comfort of the conditions in the experimental room on a scale of five points ranging from 1, very uncomfortable, to 5, very comfortable. The average votes for five such experiments are indicated below.

AVERAGE COMFORT VOTES UNDER DIFFERENT ATMOSPHERIC CONDITIONS.

Room temperature.		Relative humidity.	Comfort vote.				
C.	F.		Series I.	Series II.	Series VI.	Series VII.	Series VIII.
°	°	<i>Per cent.</i>					
10	50	50					3.4
20	68	50	3.8	4.2	4.1	4.7	4.1
24	75	30					3.9
24	75	50			4.1	4.6	
24	75	80					3.0
30	86	30					2.8
30	86	80	2.8	3.6			2.6

It will be noted that in each series the 20° C. condition was most appreciated and the warmer and more humid atmospheres became progressively uncomfortable. The difference between 20° C. and 24° C. was scarcely appreciable, however, in these records of conscious discomfort. Yet even this range of temperature produced a distinct difference in the demeanor. At 20° C. our observers' notes are full of such qualifying phrases as "playful, energetic, good work, inclined to 'rough house,' hard to control, less drowsiness than usual"; while at 24° C. we find such notes as the following: "Sleepy, eyes smarted, less inclination to work, lifeless, drowsy, more conversational than usual."

The real effects of air temperature upon efficiency were brought out by a series of "option tests," in which the subjects for a given period were given a choice between physical or mental work on the one hand and idling on the other, receiving a small cash bonus if they did the work. This is a condition which approximates the actual conditions of school and industrial life, in furnishing a real but not an overmastering stimulus to effort, with the alternative possibility of taking life more or less easily.

Even this form of option test did not disclose any harmful effect of the 24° C. (75° F.) condition on purely intellectual work, such as mental multiplication. On the contrary, the average of three series of experiments with 47 different male and female subjects, extending over a period of 16 weeks, showed that 4.9 per cent more mental multiplication was done at 24° C. than at 20° C. It may be that work of this kind offered a certain distraction under slightly uncomfortable conditions, and it is also possible that the subjects found the 20° C. condition somewhat too cool for purely sedentary work. It may be noted, however, that when the temperature was changed abruptly in the middle of the day slightly more mental multiplication was done at 20° C. In one series in which a temperature of 30° C. was also used we obtained the results tabulated below, which are of interest as showing a steady

improvement in all tasks during the first three days, due to practice and to improving temperature conditions. On the fourth day, with a temperature of 24° C., mental multiplication continued to improve with practice, but typewriting fell off; and on the fifth day a rise to 30° C. caused a falling off in all the tasks, with subsequent improvement on return to 20° C. on the sixth day.

INCLINATION TO DO VARIOUS KINDS OF MENTAL WORK AND TYPEWRITING AT DIFFERENT TEMPERATURES—ALL WORK OPTIONAL.

[Series V; 4 subjects; 6 days; summer. Conditions below are in order of occurrence.]

	30° C. 86° F.	24° C. 75° F.	20° C. 68° F.	24° C. 75° F.	30° C. 86° F.	20° C. 68° F.
Mental multiplication.—Number of problems done times 10 (score)—Total, all subjects.....	583	1,295	1,495	1,550	1,341	1,930
Percentage of error to mental multiplication score.....	1.26	1.19	0.71	0.57	0.65	0.54
Typewriting.—Number of lines times 10—Total, all subjects.....	1,085	1,692	2,215	585	290	1,358

In all our experiments typewriting, which involves some muscular work, was clearly and unfavorably affected by even a moderate rise in temperature. The table below shows in detail the results as to both mental multiplication and typewriting for three series of experiments. The general average shows, as noted above, an excess of 4.9 per cent in mental multiplication at 24° C. for all series. On the other hand, the average amount of typewriting done was 6.3 per cent greater at the cooler temperature. Both the increase in mental multiplication and the decrease in typewriting at 24° C. were much more marked when the change in temperature was made in the middle of the day than when the cool and the warm conditions were continued for three to five days at a time.

PRODUCT PRODUCED IN MENTAL MULTIPLICATION AND TYPEWRITING AT DIFFERENT TEMPERATURES WHEN THE WORK IS PERFORMED AT THE OPTION OF THE SUBJECT.

[Figures below are the scores obtained. The score is based on quantity of work done with an allowance for quality of the work.]

Series.	Test.	68° F. half day.	75° F. change.	68° F. three days.	75° F. change.
VI. 16 men, 4 weeks, stagnant air.	Mental multiplication.....	85.8	80.5	51.1	87.4
	Typewriting.....	324.3	215.7	371.9	450.3
VIII. 16 men, 4 weeks, stagnant air.	Mental multiplication.....	200.8	212.7	183.2	190.5
	Typewriting.....	189.4	169.5	330.9	304.0
XIV. 15 women, 8 weeks, air supply.	Mental multiplication.....	147.7	139.6	52.6	64.5
	Typewriting.....	289.5	267.3	302.9	306.0
	Addition.....	154.0	155.5	123.1	123.3

Mental multiplication is a type of pure concentrated intellectual work which has no analogue in the ordinary affairs of daily life. Typewriting on the other hand is fairly typical of most office work

which involves a fair proportion of light muscular activity. That the amount of such work performed was 6.3 greater at 20° C. (68° F.) than at 24° C. (75° F.) seems a highly significant fact.

Passing to the problem of heavier physical work such as lifting dumb-bells or riding a stationary bicycle the effect of temperature was very much more marked. The tests were conducted on the same optional basis used in the previous experiments and the results as tabulated below indicate a striking influence of air conditions, 15 per cent more work being done at 20° C. (68° F.) than at 24° C. (75° F.) and 27 per cent more than at 30° C. (86° F.).

AMOUNT OF PHYSICAL WORK PERFORMED BY SUBJECTS AT WILL UNDER DIFFERENT TEMPERATURES.

Series III; 4 subjects—Summer.

Riding bicycle or lifting dumb-bells.

On 10 days at 30° C. (86° F.) an average of 31,061 foot-pounds per day was done.

On 10 days at 20° C. (68° F.) an average of 42,820 foot-pounds per day was done.

This is 37 per cent more at 20° C. (68° F.).

Series VII; 4 subjects.—Fall.

Lifting dumb-bells. Bonus paid for physical work.

On 10 days at 24° C. (75° F.) an average of 22,075 foot-pounds per hour was done.

On 10 days at 20° C. (68° F.) an average of 25,250 foot-pounds per hour was done.

This is 15 per cent more at 20° C. (68° F.).

That such conditions of overheating as were used in these experiments are very common in industrial plants is made clear by numerous observations. Thus in the reports of the commissioner of labor of New York State for 1908, 1909, and 1910, there are recorded temperatures observed in 215 different workrooms, printing shops, clothing shops, bakeries, pearl button factories, cigar shops and laundries. One hundred and fifty-six of these workrooms, or 73 per cent, had a temperature of 23° C. (73° F.) or over, and 63, or 29 per cent, had a temperature of 27° C. (80° F.) or over. In tabulating these analyses all cases were excluded in which the outdoor temperature was over 21° C. (70° F.).

It must always be remembered that indoor temperatures over 20° C. are much more detrimental in their effect than the same temperatures outdoors, on account of the comparative absence of air movement. The actual effect of the atmosphere upon the body depends on the rate of heat loss from its surface and this depends on the humidity and movement of the air as well as on its temperature. Leonard Hill

has devised an instrument called the Kata thermometer for measuring the combined effect of all these factors by the rate of cooling of special wet and dry thermometer bulbs previously heated to a temperature above that of the atmosphere. Studies made by me with this instrument have shown that a temperature of 24°-26° C. (75°-79° F.) outdoors with a moderate breeze were more comfortable than an indoor temperature of 22° C. (72° F.) in a room with a fire.

The results of our experiments on the effect of air temperature upon optional work can not of course be directly applied in a quantitative sense to work under factory conditions. Our subjects were permitted to remain entirely idle if they chose. On the other hand they had a slight but distinct money incentive to accomplish as much as possible, while the factory operative, if not employed on piece-work, had ample opportunity to work at somewhat less than maximum efficiency without any loss as a result. The experiments cited furnish very clear evidence that a temperature of 24° C. (75° F.) and still more one of 30° C. (86° F.) produces a marked disinclination to any form of physical work, even such light work as typewriting. It can hardly be doubted that this disinclination actually results under factory conditions in a definite decrease in output. And if such is the case the problem of securing adequate factory ventilation and taking other steps necessary to prevent overheating is one of vital importance to all who are interested in minimizing fatigue and increasing production in American industry.

DOCK EMPLOYMENT IN NEW YORK CITY.

In 1912, under the direction of the Russell Sage Foundation, Mr. Charles B. Barnes, director of the New York City Public Employment Bureau, made a careful and exhaustive study of irregularity of employment in longshore work on the docks, an occupation in which casual and intermittent employment is a pronounced feature, present at normal times and aggravated in times of industrial depression.¹ Prior to that date no systematic study of dock labor in this country had been made, and since the report of Mr. Barnes was published no further organized study was attempted until the mayor's committee on unemployment selected this occupation as the first to receive special attention in the campaign against irregularity of employment. In its report, issued October 16, 1916,² the committee reviews at length the present conditions of longshore

¹ The Longshoreman, by Charles B. Barnes, New York Survey Associates, Inc. A digest of this volume appeared in the MONTHLY REVIEW for May, 1916, pp. 1-7.

² Report on dock employment in New York City, and recommendations for its regularization. Mayor's committee on unemployment, New York City, October, 1916. 82 pp. Price, 50 cents.

work and suggests a scheme for centralization and regularization of the employment of longshoremen—a plan which embodies as its essential feature the actual and effective cooperation between employers and employees. This would call for much time and thought, sacrifice of established habits, inconvenience, and possibly initial hardships to both employers and employed. In considering irregularity of employment, the reasons for considering first this particular occupation are set forth as follows:

It is probably the largest field of casual labor in the city, approximating 40,000 men.

In some of its features it more seriously concerns the public welfare than other casual trades.

Earnings at the present time are better than they have been for years, and both employers and employed are therefore likely to be more willing to consider a scheme under which the advantages to both from more regular employment might be secured permanently.

The industry is one upon which the prosperity of the whole city depends. It can not be allowed to endanger that prosperity by the continual presence of dissatisfaction and unrest among the workers or that of conditions of which the city as a whole should be ashamed.

In efforts toward the regularization of dock employment we have the special advantage of being able to learn from the example of other large ports and from a not negligible literature on the subject.

The longshoremen are mostly Irish, German, and Italian, the majority being between 30 and 40 years of age and recruited from the ranks of the unemployed. As to wages and earnings, it is stated that no statistics are available, but that wages per hour have increased throughout the port since the last inquiries were made. Since May 1, 1916, members of the International Longshoremen's Union have been paid 40 cents per hour (60 cents per hour for overtime and 80 cents per hour for work on Sundays and certain holidays) in the trans-Atlantic trade, while in the coastwise trade the corresponding rates are 35, 50, and 65 cents. It is almost impossible to obtain facts as to the average earnings, but they seem to range from about \$9 to \$15 or \$16 per week, which, if the above hourly rates are taken as the basis, indicate the extreme irregularity of the work.¹ It appears, however, that some longshoremen receive 27½ cents per hour, while others receive from 20 to 25 cents. Irregularity of employment was found to be due to the following causes:

(1) Conditions of weather (fog, etc.); (2) fluctuations of commerce; (3) political conditions (war, etc.); (4) variations—to some extent—in the nature of cargo, each requiring a different set of specialized workers; (5) unknown nature of cargo to be loaded or unloaded; (6) irregular or late signaling of arrival of vessels; (7) lack of a plan of work at commencement of loading or unloading operations, or, if such a plan is made, uncommunicativeness of

¹ Examples are given showing the hours worked by longshoremen on typical weeks in May and June, 1916, which indicate a range of from 15 to 78½ hours.

employers which forces men to stand about for hours waiting to be called; (8) deliberate splitting up of available work to maintain as large as possible a labor reserve; (9) "knocking off" men in case of unavoidable delays; (10) complete absence of a plan for pooling labor reserves of different piers and employers; (11) unwillingness of longshoremen to work regularly at a weekly wage.

After commenting upon the results of the irregularity of employment on health and on the standard of living, the committee reaches the following conclusions:

(1) The labor is recruited, without any system, from all nationalities, age groups, men of all kinds of stature, health, previous occupations. It is a process of drift rather than of entrance.

(2) Conditions of hiring are degrading in the extreme, do not insure selection of the most efficient workers, are open to the danger of graft, and are in themselves a continual source of dissatisfaction.

(3) Outside trade-union ranks there are not accepted standards with regard to either remuneration or services rendered. Wages and earnings vary enormously, both in time and locality.

(4) The time of the worker is wasted in needless waiting, in "knocking off," without payment, during delays; in having to collect his earnings from a number of sources. The hourly rate of wages, even when relatively high, can not, unless accompanied by a system of more or less regular employment, compensate for this loss which falls entirely on the worker.

(5) Needlessly long shifts of work produce overfatigue, inefficiency, accidents.

(6) Conditions of employment, bad for the employees as regards character, health, habits, and standard of life, have no element of advantage whatsoever to the employer. They make for inefficiency, unreliable labor supply, both as regards number and composition; high cost of supervision and compensation for accidents; irresponsibility and hostility of the workers; public opprobrium.

The public interest in this matter must not be overlooked. Present conditions of longshore employment in New York mean poverty, intemperance, dependency, insanitation. We can not measure these effects; they permeate the life of the city. They make it a less efficient and a more costly traffic terminal than it might be, and reduce general prosperity. It is time this condition were ended.

A plan for centralizing and regularizing the employment of longshoremen should work along the lines of centralizing the places of hiring and payment, unifying the times of hiring and payment, and humanizing the methods of hiring and payment. "The principle underlying such an improvement would have to be that of friendly cooperation (by means of some form of joint organization) between employers (steamship companies and stevedores) and employed (organized and unorganized)." Notwithstanding possible objections of employers and of laborers to a scheme for the decasualization of dock labor it is believed that regularization may be effected gradually and imperceptibly at a time of good trade when there is a keen demand for workers in other occupations. A plan to allow individual

employers to work out a scheme of decasualization would not, it is thought, be practicable. Instead—

Any proposal to promote greater regularity in the employment of longshoremen in New York should meet the following conditions:

1. It must embrace all or the greater part of the employers and the work offered by them;
2. It must discourage the drift into longshore labor from other employments;
3. It must as far as possible concentrate the work of the port upon men dependent upon longshore employment for their livelihood and competent for it;
4. It must facilitate means of knowing the exact times of commencement of work and of its probable duration;
5. It must facilitate the transfer of labor from one part of the port to another;
6. It must make more uniform the times of hiring and reduce the number of places for hiring labor.

These conditions are considered essential. Other desirable conditions include the following:

1. It should improve the character of the place where the hiring is done;
2. It should improve the method of hiring;
3. It should confine hiring to certain hours of the day within the utmost limits of practicability;
4. It should in some form place upon the employer at least part of the financial burden of time lost by waiting through unavoidable delays;
5. It should safeguard the workers against the working of unreasonably long shifts;
6. It should, if possible, facilitate the finding of alternative work by men not hired but desirous to work;
7. It should, if possible, centralize the payment of wages for men who during a weekly wage period have worked for more than one employer;
8. It should lay upon employers a greater responsibility than that now recognized by them for the provision of proper coat room and sanitary conveniences, and an accessible water supply and for the provision of first-aid facilities.

For the adequate centralization and regularization of employment the essential principle involved is willing cooperation of employers with each other, of employers with the workers, both organized and unorganized, and of organized and unorganized workers.

To effect such cooperation and make possible the carrying out of the conditions just noted the recommendation is made that a committee of five representatives of employers, five representatives of employees, and five disinterested persons be appointed, whose first duty shall be to draw up a "system of placement of workers under which all participant employers would undertake not to engage longshore labor except through the agency of the committee or of the employment bureau affiliated to it, and all registered workers would undertake not to seek employment except through its agency." It is admitted that this might be objected to, "but the scheme is un-

workable unless both sides are willing to have their freedom in these respects somewhat curtailed." Assuming that an agreement of this kind is adopted by both sides, the next step is the establishment of a clearing-house system, publicly controlled, for the registration of employees and the regularization of hiring, which system would exist primarily for the purpose of legitimate communication between different parts of the harbor as to available jobs and available workers. Through its central office this clearing house would be connected up with the labor market of the city as a whole and of the State as a whole. It is believed that such a system would do away with many of the causes of irregularity of employment heretofore mentioned.

For instance, the time of a ship's arrival would be communicated to the central office, which would in turn telephone the news to the branch office in charge of that particular district. An estimate would be made of the number of men required, and these, if not in the waiting room, would be communicated with directly through their unions or through other branch offices having an available supply. Hiring would be done as near as possible at one time instead of at all hours of the day, and the jobs would be equitably distributed. If an employer had an agreement with a union as to preference in employment, these men would be sought and employed first. The report makes suggestions as to clearing-house areas in the city, with the recommendation that each shall contain a number of "stands" or shelters, with a small employment office. In order to give the workers a chance to be employed in other lines of work, it is recommended that the clearing-house system be a part of a public employment-bureau system. It is also suggested that a plan be adopted by which wages may be paid through a clearing house at a certain time, instead of on different days and at points sometimes distantly removed, causing the workers to lose much time and possible opportunity for employment in collecting their pay.

One of the functions of the joint committee, it is believed, should be the creation of a committee on health and safety.

The report includes appendixes setting forth a scheme for a limited application of permanent employment at weekly wages, the agreement of the International Longshoremen's Association with certain New York employers, and a discussion of the opportunities offered by truck gardening as an alternative employment for longshoremen.

BRITISH SYSTEM OF LABOR EXCHANGES.

The British system of labor exchanges, an account of which appears in Bulletin No. 206 just issued by this bureau, was established in 1909 for the purpose of increasing and improving means of communication between employers seeking workpeople and workpeople seeking employment. There were in January, 1916, 390 labor exchanges controlled by divisional offices or clearing houses and coordinated with a central clearing house in London, the entire cost being borne by the Government. Applicants must furnish certain detailed information to the official, as must also those desiring to register vacancies. In filling vacancies the exchange does not assume any responsibility as to the ability or character of the person nor does it undertake any responsibility to workers concerning the matter of wages and other conditions of the work offered. The future chances of an applicant are not prejudiced by his refusal to accept a position offered. All applicants are advised if strike conditions exist and employers are advised if statements have been filed by workers with the exchanges telling of the existence of a strike or lockout affecting their trade.

In 1915 these labor exchanges received 3,186,137 applications (2,326,803 individual applicants), registered 1,797,646 vacancies, placed 1,058,336 persons in employment, and filled 1,308,137 vacancies. The effect of the war has been to increase the number of women and girls on the registers, and it has also increased the daily average vacancies filled by these workers 57.3 per cent in 1915 as compared with 1914. In the case of men the daily average number of vacancies filled in 1915 increased only 4.9 per cent over 1914.

The effect of unemployment insurance has not been to reduce the work of the labor exchanges, for in 1915 the proportion of vacancies filled was rather higher in the insured than in the uninsured groups of trades.

The labor exchanges have in a measure reduced the amount of casual labor. They have also exercised on public opinion and through it on the enterprise of municipalities and other public authorities and on big corporations an influence in the direction of reducing seasonal employment. A large number of females have been placed in employments through the exchanges, which have proved of great value in the organization of the female labor market during the war. Following an appeal made in March, 1915, for women to register for war service 124,405 names were secured, the total number placed before the end of the year being 8,255.

The work among minors has so far been the most successful part of the placement work. The proportion of reported vacancies filled in each year since 1911 was less than in the case of adults, but the

proportion of individual applicants registered for whom work was found was substantially greater. Employers have been materially aided in the selection of applicants by the preliminary data obtained by the exchanges, and they have been able to persuade juveniles so employed to remain with them if acceptable, or are able with better conscience to dismiss the boys and girls unsuitable for the work.

The great advantage of these labor exchanges to employers is that the latter are afforded opportunity of effecting large savings in time and money by pooling their labor reserves with those of other employers. Employees recognize in the exchanges not only the obvious advantage of having the country aroused as to the seriousness of the problem of unemployment, but also the favorable effect exerted by them on wages in general; the appreciable shortening of search for work; the advantage of having their railway fares advanced when jobs are secured in other localities. In the year ending September, 1915, nearly \$37,000 was advanced in about 20,800 cases, or \$1.78 each. The labor exchanges have been of some assistance to benefit societies, hospitals, trade-unions, tuberculosis committees, and other bodies, in finding suitable employment for incapacitated workers.

Because of the provisions offered for marketing labor, the exchanges are of material advantage to the State, especially in the present war.

The labor exchange has brought thinking persons of both the employing and working classes to a fuller realization of the many misfits, hardships, physical and moral breakdowns which could be avoided by a more careful selection of employees on the one hand and of positions on the other. It has provided the nation with reliable data on the state of employment, comparable for different times, different trades, and different localities, on a sufficient scale to permit of safe deductions. It has helped the scientific analysis of the problem of unemployment, and thereby brought appreciably nearer its final solution. It has contributed to our knowledge of the causes of and best remedies for specific social problems, such as casual and seasonal irregularity of employment.

COST OF LIVING AND THE MINIMUM WAGE IN NEW SOUTH WALES.

During the first half of 1916 in New South Wales, Australia, the insistent demands of the workpeople on employers for an increase of wages and the attitude of employers toward granting such increase in view of economic conditions in the Commonwealth (increases in many instances having been awarded by individual wages boards) resulted in representations in June, 1916, before the court of indus-

trial arbitration by the union of secretaries and the employers' federation in order that the court might determine the expediency of reconsidering its views upon the questions of the cost of living and the minimum wage and of altering the minimum wage rate upon which it had been working during the previous six months. In the "living-wage judgment" of February, 1914,¹ the court had fixed the minimum wage at £2 8s. (\$11.68), and in December, 1915, owing to the extraordinary conditions growing out of the war, the same authority had increased the minimum to £2 12s. 6d. (\$12.77).

At the hearings granted by the court in June, 1916, the employees based their claim for a higher minimum rate almost entirely upon the apparent industrial prosperity and upon the actual increasing cost of living indicated by the variation in the purchasing power of the sovereign as shown in tables prepared by the Commonwealth statistician. It was pointed out that "the workingman, whose lowest wage was declared to be 51s.² [\$12.41] in February, 1914, as a matter of fact during the period from February, 1914, to the end of 1915 has been working for a wage which had only an effective value of 44s. 4d. [\$10.79]," and that "giving effect to that judgment would result in a living wage of not less than 60s. 8d. [\$14.76] being paid in place of 51s.² [\$12.41] then awarded."

The employers' federation, on the other hand, explained to the court that the prosperity in a few concerns, to which the employees had referred, was no greater than before the war, and that any claim for an increase of the minimum wage rate should be supported by the facts of the individual case in which it was sought to increase that wage, or at least should be supported by a genuine finding of the court after a full inquiry into all the circumstances. It was stated that "the court does not, by refusing to alter the £2 12s. 6d. [\$12.77] minimum, prevent the consideration by wages boards of individual cases upon their merits."

The judgment of the court of industrial arbitration, which increased the minimum wage 3s. (73 cents), was rendered on August 18, 1916, the text being given in full in the New South Wales Industrial Gazette (Sydney) for September, 1916, pages 918-928.

At the outset the court disposed of the claim that the variation in the purchasing power of the sovereign was an index of the rising cost of living by calling attention to its previous announcement that the court could no longer, under the present circumstances, accept the figures of the Commonwealth statistician as an accurate guide to the changes in the actual cost of living, for the reason that the real cost

¹ See United States Bureau of Labor Statistics Bulletin No. 167, p. 147.

² This amount was used by the representative of the union of secretaries in his argument before the court. It does not agree with the amount awarded in February, 1914, which, as already indicated, was 48s. (\$11.68).

of living is elastic and adapts itself to circumstances, while the statistician is compelled to limit himself to a fixed and rigid regimen.

The court took the position, as announced in a previous decision, that "it will still have to continue to fix a living wage on the best evidence obtainable, and can not base it on any particular return for any particular quarter or for any abnormal period, but on the proved average cost of reasonable food, clothing, rent, etc., over a reasonable period, recognizing that the award is to continue during normal and abnormal times."

The court felt the importance of discovering, if possible, the causes of the admitted increase in the cost of living, and noted as the first cause the war in Europe.

To some extent it is of value to know that in a general way it is caused by the war, for war burdens, besides being abnormal and temporary, are community burdens, and every one ought to be prepared to bear his share. * * * The very principle laid down in the living-wage judgment—that times of prosperity should be reflected in the wage rates—implies that times of adversity should also be reflected in the wage rates.

A second cause given for the rising cost of living was the large issue of paper money by the Commonwealth and the practical withdrawal of the sovereign from circulation. But if the issuance of notes by the Government may be considered a cause, or partial cause, of the increase in the cost of living, "a very serious question would arise whether it should be added onto the wage rates."

It would be a war tax; and should not every man pay his own taxes? Is taxation which is deliberately imposed upon the whole community to be converted by the court into double taxation upon a part of the community? Or if that is to be done to preserve the minimum wage, is it to be done for wages which are higher than that?

Another alleged cause is the slowing off of workers, which the court admitted must result in increasing the cost of production, which the community itself, including these same slow workers, has to pay. Two cases were cited. It was pointed out that on the railways slow work has increased expenses, while in certain munitions factories workers had to be discharged for slowing off.

In one case they were traitors enough to help the enemy, and in both they were dishonest enough to rob their Australian brethren by taking a full day's wage for half a day's work. What chance is there, then, that they have not done the same to the private employer? * * * The employers have complained for a long time that slow work is increasing; the public service has now confirmed them.

But this cause in itself was not considered by the court a sufficient reason to grant a higher minimum wage rate to meet the increase in the cost of living so caused.

While holding that the practice of slowing off among workers ought to be given weight in considering the general question of a

living wage, yet the court was not willing to admit that the ranks of employees had been permeated by this practice, but preferred to believe that there are many thousands of workers, presumed to be the "greater majority until the contrary appears too plainly for us to resist it," who take pride in their trade and whose interests ought to be considered in arriving at a fair determination. In this connection the court felt itself bound to consider the question of extensive violations of the law through strikes, which it characterized as "slow work carried to its extreme, and though they have not the despicable and fraudulent character of slow work, they, none the less, like slow work, destroy wealth, increase expenses, and injure every class in the community. And in New South Wales they are illegal."

The court thus summed up its argument on this point:

Can a class which has, by illegal acts, increased the cost of living to the whole community, fairly ask to have that increase refunded to itself in a higher rate of wage, and so still further increased to everybody else? The logical result, as in the case of slow work, would be that the more they struck, that is, the less work they did, the more they would be paid for what they did; till at last men would get a full week's keep, however dear their idleness might have made it, for doing nothing.

After suggesting its attitude toward the arguments which were presented, the court announced its determination to set aside the questions of paper money, slow work and strikes, and base its conclusions alone upon the fact of the existence of war which "can not be disregarded by us in considering at what the living wage should be fixed." The impossibility of defining the living wage in terms which make it inelastic is admitted, such words as "fair" and "reasonable" being relative and introducing existing circumstances into the problem.

The court had previously laid it down that in times like these the higher classes of workers can no longer claim as a right the same proportion above the living wage as prevailed before the war, and in doing so recognized the fact that all classes must bear their share, those who are able bearing the greatest burdens and the lowest wage earners bearing the lightest. Where to draw the line of demarcation has been the difficult problem to solve.

In view of all the facts presented to it the court was led to the conclusion that for future awards the minimum wage should be 1s. 1½d. (28.1 cents) per hour or 9s. 3d. (\$2.25) per day or £2 15s. 6d. (\$13.50) per week. As to existing awards the court decided that such might be reopened to allow all wages to adult males which are below 1s. 1d. (26.4 cents) 1s. 2d. (28.4 cents) an hour or 9s. (\$2.19) a day or £2 14s. (\$13.14) a week to be brought up to that amount. The award of the court is for three years.

LABOR CONDITIONS IN HAWAII.

A statement has been received by the Bureau of Labor Statistics from Mr. Ralph A. Kearns, commissioner of immigration, labor, and statistics of the Territory of Hawaii, in which it appears that under the bonus system¹ in operation on the sugar plantations on the islands laborers received during the five months ending March 31, 1916, a bonus of 41 per cent of the wages earned by them during that period and during the seven months ending October 31, 1916, they were paid 61.5 per cent of their wages in the form of a bonus. This per cent is determined by the amount, above a certain minimum price per pound, the plantation received for sugar sold during the year. With the price of sugar not exceeding 3.5 cents per pound in New York, that is, \$70 per ton, no bonus was paid. The price, however, did not at any time fall as low as 3.5 cents. For every \$1 a ton that the average price rose above \$70 a bonus of 1 per cent was paid prior to April 1, 1916, and a bonus of 1.5 per cent subsequent to April 1.

As an illustration of the extent of this participation in the profits, which were largely increased by reason of the advance in the price of sugar and which it is estimated will total approximately \$5,000,000, the commissioner states that one plantation distributed to Filipino laborers alone \$25,000, an average of about \$73.94 per man. Under the plan in force since April 1, 1916, a man is required to work 20 days in a single month irrespective of whether he worked the required number of days in any other month. Heretofore he had to work a total of 240 days in a year.

An increase in the wage rate on the Oahu Railway & Land Co. is mentioned, the section men, in June, 1916, receiving an advance from \$1.35 to \$1.50 per day. On the pineapple plantations and in the canneries the wages of workers have been increased by 10 per cent.

Following a strike of longshoremen in September and October, 1915, at Honolulu, the wages of these laborers were increased to 30 cents per hour for a nine-hour day, 50 cents for overtime at night, and 45 cents per hour for work on Sundays and holidays. The former rates were \$2 per day for nine hours, 40 cents per hour for overtime at night, and \$3 per day for work on Sundays and holidays.

The statement notes some improvements in housing accommodations for plantation laborers, and concludes with a reference to a slight shortage in the supply of labor throughout the Territory.

It remains to be seen whether this condition will not become more pronounced as a result of the receipt of considerable sums of money distributed under the bonus system.

¹ A brief explanation of the bonus system appeared in the MONTHLY REVIEW for September, 1916, pp. 48, 49.

IMMIGRATION IN NOVEMBER, 1916.

The number of immigrant aliens admitted into the United States during the year 1916 has been in excess of the number admitted during 1915. There has also been an increase from month to month during 8 of the 12 months. The figures for the month of December show a decrease of 10.3 per cent. These facts are brought out in the statement following:

IMMIGRANT ALIENS ADMITTED INTO THE UNITED STATES IN SPECIFIED MONTHS, 1913, 1914, 1915, AND 1916.

Month.	1913	1914	1915	1916	
				Number.	Per cent increase over preceding month.
January.....	46,441	44,708	15,481	17,293	8.5
February.....	59,156	46,873	13,873	24,740	43.1
March.....	96,958	92,621	19,263	27,586	11.5
April.....	136,371	119,885	24,532	30,560	10.8
May.....	137,262	107,796	26,069	31,021	15.1
June.....	176,261	71,728	22,598	30,764	1.8
July.....	138,244	60,377	21,504	25,035	18.6
August.....	126,180	37,706	21,949	29,975	19.7
September.....	136,247	29,143	24,513	36,398	21.4
October.....	134,140	30,416	25,450	37,056	1.8
November.....	104,671	26,298	24,545	34,437	7.1
December.....	95,387	20,944	18,901	30,902	10.3

¹ Decrease.

Classified by races, the number of immigrant aliens admitted into and emigrant aliens departing from the United States during November, 1915 and 1916, was as follows:

IMMIGRANT ALIENS ADMITTED TO AND EMIGRANT ALIENS DEPARTING FROM THE UNITED STATES, NOVEMBER, 1915 AND 1916.

Race.	Admitted.		Departed.	
	November, 1915.	November, 1916.	November, 1915.	November, 1916.
African (black).....	331	729	390	244
Armenian.....	90	159	54	.....
Bohemian and Moravian.....	72	43	3	3
Bulgarian, Serbian, Montenegrin.....	99	76	20	2
Chinese.....	164	153	288	101
Croatian and Slavonian.....	110	32	6	15
Cuban.....	257	154	107	297
Dalmatian, Bosnian, Herzegovinian.....	8	.....	1	.....
Dutch and Flemish.....	782	866	57	46
East Indian.....	4	9	21	83
English.....	3,540	3,604	916	614
Finnish.....	397	942	34	178
French.....	2,260	4,642	189	218
German.....	1,092	1,342	95	51
Greek.....	853	2,009	267	131
Hebrew.....	1,576	1,908	25	13
Irish.....	2,896	2,046	276	219
Italian (north).....	431	492	347	561
Italian (south).....	2,441	5,531	8,440	1,327
Japanese.....	590	741	99	112

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IMMIGRANT ALIENS ADMITTED TO AND EMIGRANT ALIENS DEPARTING FROM THE UNITED STATES, NOVEMBER, 1915 AND 1916—Concluded.

Race.	Admitted.		Departed.	
	November, 1915.	November, 1916.	November, 1915.	November, 1916.
Korean.....	7	15		13
Lithuanian.....	53	72	3	
Magyar.....	102	72	31	12
Mexican.....	1,008	1,683	103	56
Pacific Islander.....				
Polish.....	339	233	20	5
Portuguese.....	658	173	407	325
Roumanian.....	82	40	3	5
Russian.....	449	408	274	542
Ruthenian (Russniak).....	94	94		
Scandinavian.....	1,318	2,576	277	503
Scotch.....	1,330	1,516	207	214
Slovak.....	99	33	5	1
Spanish.....	597	1,104	321	334
Spanish-American.....	119	100	36	50
Syrian.....	69	91	12	7
Turkish.....	5	102	4	9
Welsh.....	112	98	32	20
West Indian (except Cuban).....	64	110	57	23
Other peoples.....	47	329	37	26
Not specified.....			1,019	804
Total.....	24,545	34,437	14,483	7,164

OFFICIAL PUBLICATIONS RELATING TO LABOR.

UNITED STATES.

ALABAMA.—*Annual Report of Coal Mines, State of Alabama. 1915. 88 pp.*

Gives a directory of coal mines in the State; tables showing seam of coal, thickness, number and kind of openings, number of employees, mode of ventilation, etc.; production, number of days worked, price per ton paid miners, means of transportation, etc.; coal and coke production in Alabama, 1870–1915; a list is also given of fatal accidents during 1915.

About 47 pages of the report are devoted to a description of the mines in each of the six inspection districts into which the State is divided.

CALIFORNIA.—*Industrial Accident Commission. Air-pressure Tank Safety Orders, effective January 1, 1917. Sacramento, 1916. 10 pp.*

— *Electrical Utilization Safety Orders, effective January 1, 1917. Sacramento, 1916. 63 pp.*

— *Elevator Safety Orders, effective October 1, 1916. Sacramento [1916]. 57 pp. illustrated.*

In addition to the orders, contains the result of tensile strength tests on elevator cables and fastenings.

— *Report, July 1, 1915, to June 30, 1916. Sacramento [1916]. 152 pp.*

A summary of this report will appear in a future issue of the MONTHLY REVIEW.

— *Trench Construction Safety Orders, effective January 1, 1917. [Sacramento] 1916. 7 pp.*

— *Window Cleaning Safety Orders, effective January 1, 1917. [Sacramento] 1916. 7 pp.*

HAWAII.—*Board of Immigration, Labor and Statistics. Fifth report, for the period from July 1, 1915, to June 30, 1916. Honolulu, 1916. 43 pp.*

Almost entirely devoted to tables showing by months, by three-month periods, by six-month periods, and by the year, the number of steerage arrivals and

departures; also the number of cabin arrivals and departures for the year ending June 30, 1916. The total of arrivals was 17,909, and the departures totaled 15,240. There is an insert showing the quarterly retail food price report for the year ending June 30, 1916.

ILLINOIS.—*Bureau of Labor Statistics. Industrial Accidents in Illinois. Eighth report, for the year ending December 31, 1914. 79 pp. Ninth report, for the year ending December 31, 1915. 64 pp. Springfield, 1916.*

A brief summary of these reports will appear in a future issue of the MONTHLY REVIEW.

MASSACHUSETTS.—*Industrial Accident Board. Third annual report, July 1, 1914, to June 30, 1915, inclusive. Public document 105. Boston, 1916. 350, clxxii pp. Illustrated.*

This report will be summarized in a future issue of the MONTHLY REVIEW.

—*Minimum Wage Commission. Bulletin No. 12, November, 1916. Preliminary report on the effect of the minimum wage in Massachusetts retail stores. Boston, 1916. 53 pp.*

For a digest of this report see pages 251 to 257 of this number of the MONTHLY REVIEW.

NEVADA.—*First biennial report of the Commissioner of Labor. 1915-1916. Carson City, 1917. 48 pp.*

Presents the material collected by the newly created office of commissioner of labor. An act of the legislature of 1915 provides that a member of the Nevada Industrial Commission shall be designated ex officio as commissioner of labor. His duties, as prescribed in the act, require him to gather statistics on 14 different subjects: Agriculture; mining; mechanical and manufacturing industries; transportation; unskilled labor; number, sex, age, etc., of persons in employment; number and condition of the unemployed; sanitary conditions of the working classes; number of Chinese and Japanese in the State; employment of inmates of prisons and county jails, especially as viewed in competition with free labor; hospitals and fees charged employees; labor organizations; employment agencies; other information relating to labor, as may be deemed essential to further the object of the enactment.

Statistics on some of these subjects were gathered by the use of blank forms of inquiry transmitted through the post office, only about 50 per cent of the blanks mailed being returned with information of any value. The greater part of the report is devoted to tables showing number of employees in industrial and commercial establishments from which reports were received, and their average daily wages and hours of labor; number of employees and average daily wages in mines and ore-reduction works; and wages and hours of railway employees.

The report closes with a recommendation that statistical material be collected by personal canvass instead of by mail.

—*Industrial Commission. Report, July 1, 1913, to June 30, 1916. Carson City, 1917. 110 pp.*

A digest of this report appears on pages 262 to 264 of this issue of the MONTHLY REVIEW.

NEW YORK.—*Department of Labor. Annual report of the Industrial Commission, April 17, 1916. Albany, 1916. 417 pp.*

A summary of this report will appear in a future issue of the MONTHLY REVIEW.

OHIO.—*Industrial Commission. Communication, under date of December 22, 1916, addressed to the subscribers of the Ohio State Insurance Fund. [Columbus, 1916] 4 pp.*

Calls attention to the immediate upward revision in compensation rates in New York, Massachusetts, and Pennsylvania, determined upon by the Workmen's Compensation Service Bureau because insurance companies "have been writing millions of dollars of compensation premiums at a tremendous loss," this loss being brought about by the fact that rates were based upon a period of depression in which a brief experience was developed by virtue of the fact that the careful, experienced, and dependable employees were the ones retained, working in the absence of stress, and also due to the fact that rates were based upon a period of abnormal industrial stress, accompanied by a serious impairment of accident experience occasioned by the employment of inexperienced workers, and the rush in getting out large volumes of orders, which resulted in less attention being given to accident prevention. The increase in the frequency and severity of accidents correspondingly increased the cost of industrial accidents in every State having a compensation law. It is stated that this upward revision of rates "must take place in Ohio because their eastern and the Ohio rates have been computed on precisely the same basis." The communication also directs attention to some practices of insurance companies "that merit the sharpest criticism," and warns subscribers to the State fund against them.

— — *Department of Investigation and Statistics. Report No. 25. Statistics of Mines and Quarries in Ohio, 1915. Springfield, 1916. 99 pp.*

A digest of this report appears on pages 264 to 266 of this issue of the MONTHLY REVIEW.

PORTO RICO.—*Report of the Governor to the Secretary of War, for the fiscal year ended June 30, 1916. Washington, 1916, xiii, 483 pp.*

Includes the report of the Director of Labor which shows 399,075 agricultural laborers employed in the most important industries of the island, namely, coffee, sugar cane, tobacco, and fruits. There were 7,835 women over 16 years of age employed, and 297 children over 10 but under 16 employed. The wages ranged from 14 cents to 83 cents per day in the case of the former, and from 12 cents to 83 cents per day for the children. There were 21 strikes, the largest being a strike of agricultural workers involving 40,000 hands. It lasted 502 days. As a result wages were increased 10 to 25 per cent. Wages of masons ranged from \$1.20 to \$2.58 per day; carpenters, from 93 cents to \$2.09; helpers, from 54 cents to \$1.08. During the fiscal year the free employment agency enrolled 419 applicants for work, of which 195 were recommended and 52 were employed.

SOUTH DAKOTA.—*State Inspector of Mines. Twenty-sixth Annual Report, year ending December 31, 1915. 20 pp.*

Notes that the State mined and treated 1,889,876 tons of gold and silver ore which returned \$7,619,684.83 in bullion. It also produced 213 tons of tungsten ore valued at \$180,486.27, and 22,476 tons of other minerals, valued at \$56,231. Twenty-nine accidents were reported during the year; 6 were fatal.

TEXAS.—*Industrial Accident Board. Report for 1915-16. [Austin, 1916.] Vest-pocket size. 10 pp.*

See pages 266 and 267 for a summary of this report.

UNITED STATES.—*Board of Mediation and Conciliation. Railway Strikes and Lockouts. Washington, 1916. 367 pp.*

See pages 239 and 240 of this issue of the MONTHLY REVIEW for a digest of this report.

UNITED STATES.—*Commission on Industrial Relations. Industrial relations: Final report and testimony submitted to Congress by the Commission on Industrial Relations created by the act of August 23, 1912. Washington, 1916, 11 volumes. (64th Cong., 1st sess., S. Doc. No. 415.)*

The appearance of the first five of these volumes has already been noted (MONTHLY REVIEW for November, 1916, p. 142). The six remaining volumes have been issued, the subject matter covered by each being as follows: Volume 6. Labor conditions in construction camps; Collective bargaining in San Francisco; Industrial accident compensation; General industrial relations and conditions in San Francisco; Open and closed shop controversy in Los Angeles; 1,010 pages. Volume 7. Smuggling of Asiatics; Colorado coal miners' strike; 987 pages. Volume 8. Colorado coal miners' strike; Centralization of industrial control and operations of philanthropic foundations; Further proceedings relating to Colorado strike, large foundations, and industrial control; 1,020 pages. Volume 9. Further proceedings relating to Colorado strike, large foundations, and industrial control; Rockefeller interests in Colorado; Land question in the Southwest; 1,039 pages. Volume 10. Land question in the Southwest; Pullman employees; Harriman railroad system strike; 1,007 pages. Volume 11. Conditions of labor on the Pennsylvania Railroad; Labor and the law; Pennsylvania State police; Labor conditions in Porto Rico; 1,192 pages. The entire set contains 11,260 pages, for which, in volume 11, a subject index of 2 pages is given, also an index of all witnesses.

— *Congress. House. Committee on Interstate and Foreign Commerce. Report No. 1184, to accompany H. R. 17700. Eight-hour day for employees of carriers of interstate commerce. Washington, September 1, 1916. 1 page.*

— *Laws, statutes, etc. An act to establish an eight-hour day for employees of carriers engaged in interstate and foreign commerce, and for other purposes. Approved September 3 and 5, 1916. 2 pp. (Public, No. 252, 64th Congress.)*

This is the text of the Adamson so-called eight-hour law, which was published in the MONTHLY REVIEW for October, 1916, page 24.

— *Public Health Service. Annual Report of the Surgeon General for the fiscal year 1916. Washington, 1916. 421 pp.*

Largely devoted to a report of the Division of Scientific Research, which conducted laboratory and field investigations of the diseases of man, including occupational diseases and industrial hygiene. Studies in this connection were made of the effect of gas-heated appliances upon the air of workshops, the results of which will appear in Public Health Bulletin 81; the relation of the health of garment workers to economic status; illumination in Government departments; health conditions surrounding the employment of women in Wisconsin; study of mine sanitation and sanitation in steel plants; and a study of child-labor problems in Massachusetts in relation to health. In a section on the prevalence of disease in the United States, 45 cases of anthrax are recorded in 1915, 28, or 62.2 per cent, resulting in death. Sixty cases were recorded in 1916 up to September 1, 13, or 21.7 per cent, being fatal.

FOREIGN COUNTRIES.

AUSTRALIA.—*Department of External Affairs. Social Conditions in Australia. Melbourne, 1915. 48 pp. Illustrated.*

Gives a brief outline of educational facilities, including opportunities for technical and vocational education in the Commonwealth; religion; public justice; provisions for sick and destitute; and a statement of the Commonwealth old age and invalid pension schemes, and the maternity allowance. Pensions

begin at age 65 in the case of men and 60 in the case of women; invalid pension may begin at the age of 16 if accompanied by permanent incapacitation for work. Pension must not exceed \$130 per annum and if the pensioner has other income the total may not exceed \$260. The maternity allowance is \$25.

AUSTRIA.—*Ämtliche Nachrichten des k. k. Ministeriums des Innern betreffend die Unfall—und Krankenversicherung der Arbeiter und die Pensionsversicherung der Angestellten.* Vienna, October, 1916. (Monthly.)

Current reports on the operation of the Austrian social insurance system.

CANADA.—*Census and Statistics Office. Yearbook, 1915.* Ottawa, 1916. 707 pp. Illustrated. 2 maps.

Contains a large amount of such statistical information as is usually found in yearbooks. The report notes 43 labor disputes, involving 96 establishments, 9,140 employees and a loss of 106,149 working days. Taking the average prices 1890 to 1899 as 100, the index number of all commodities in 1915 was 148, animals and meats showing the highest increase, the index number being 187.2. A table is included showing the weekly cost of a family budget of staple foods, fuel and lighting and rent in terms of the average prices in 60 Canadian cities, by months, in 1915. This table indicates an average of \$7.87 for foods, \$1.82 for fuel and lighting, \$4.12 for rent, and a total average of \$13.84.

— *Department of Trade and Commerce. Census and Statistics Office. Fifth Census of Canada, 1911; Vol. II, Religions, Origins, etc., 654 pp.; Vol. III, Manufactures, 432 pp.; Vol. IV, Agriculture, 428 pp.; Vol. V, Forest, Fishery, Fur, etc., 171 pp.; Vol. VI, Occupations, 469 pp.* Ottawa, 1915. (Text and tables in French and English.)

The volume on occupations of the people shows 2,723,634 persons 10 years of age and over, 37.9 per cent of the total population, employed in gainful occupations; of this number 933,735, or 34.3 per cent, were employed in agriculture, and 491,342, or 18 per cent, in manufactures.

— (PROVINCE OF ALBERTA).—*Annual Report of the Department of Public Works of the Province of Alberta, 1915.* Edmonton, 1916. 307 pp.

This is the report of the minister of public works for the year ending December 31, 1915. It consists of reports submitted by the chiefs of the several branches of the department of public works: Highways; bridges; ferries; ordinary roads; trunk roads; architectural and building construction branch; surveys; mines; steam boilers; correspondence; accountants' branch.

The lengthiest report is that of the chief inspector of mines, which covers 149 pages. It presents the following information: Output in tons of the various kinds of coal mined during 1915; quantity and kind of explosives used; number of shots fired and number of misfire shots; average number of days in each month in which coal was drawn; list of prosecutions under the mines act; mines opened, operated, and abandoned during 1915; list of certificates issued under the coal mines regulation ordinance and under the mines act; description of mines; number of mine rescue stations and apparatus; list of accidents during the year 1915; specimen examination questions for applicants for certificates; wages.

DENMARK.—*Statistiske Efterretninger udgivet af det Statistiske Departement.* Copenhagen, 1916. Vol. 8, No. 18 (November 25).

Contains retail prices for November, 1916, and unemployment among trade-unions in September, 1916.

ENGLAND (MANCHESTER CITY).—[Public Health Office.] *Report on the health of the city of Manchester, 1915.* Manchester (England), 1916. 112 pp.

Shows a decrease in the death rate and also in the birth rate, but a decided increase in the death rate from tuberculosis.

FRANCE.—*Ministère du Travail et de la Prévoyance Sociale. Direction du Travail. Travaux des Commissions Mixtes Départementales pour le maintien du travail national (année 1915). Vol. 2. Départements outre que la Seine. Paris, 1916. 593 pp.*

In a circular letter of February 5, 1915, the minister of labor requested all prefects to organize departmental committees of representatives of employers and workmen, and of employers' and workmen's organizations for the discussion of problems relating to labor. These committees were to act as advisory bodies to the departmental authorities in manner similar to that of the permanent committee of the superior labor council in its relation to the State authorities. At the end of 1915 such departmental committees had been established in 62 Departments, while in only 13 Departments the prefects informed the minister that conditions did not require the establishment of such institutions. A large number of these committees formed subcommittees composed of members especially qualified for the study of certain problems. The committees have adopted numerous resolutions, which the minister of labor has examined or transmitted to other ministries if they did not come within his own jurisdiction. The ministry of labor has published two volumes containing the minutes of the sessions, the findings, and resolutions of the various departmental committees. The first of these volumes related only to the committee of the Department of the Seine. The present volume relates to the committees of all other Departments.

GERMANY.—*Amtliche Nachrichten des Reichsversicherungsamts. October 30, 1916. Berlin. (Monthly.)*

Current reports on the operation of the German social insurance system.

ITALY.—*Bollettino della Emigrazione. Commisariato della Emigrazione. Rome, October 15, 1916. Nos. 8 and 9. (Monthly.)*

Decrees of the ministry of foreign affairs and resolutions of the commission of emigration relating to the determination of steerage rates on trans-Atlantic steamers.

— *Bollettino dell' Ufficio del Lavoro. Ministero per l'Industria, il Commercio e il Lavoro. Rome. November 1 and 16, and December 1, 1916. Nos. 21 to 23. (Semimonthly.)*

Current reports on the labor market, labor disputes, employers' and workmen's organizations, retail prices, labor legislation, court decisions affecting labor, and special articles on the hygiene of labor.

— *Ministero di Agricoltura, Industria e Commercio. Direzione Generale del Credito e della Previdenza. Annali del Credito e della Previdenza. L'Assicurazione obbligatoria contro gli infortuni sul lavoro agricolo. Rome. 1916. 453 pp. (Series II, vol. 18.)*

A report of the commission charged with the study of desirable reforms in the existing workmen's accident insurance law. The report discusses and proposes a separate law for the insurance against accidents of agricultural workers; it further contains a tentative draft of such a law and shows foreign legislation on the same subject.

— — — *Provvedimenti in materia di economia e di finanza emanati in Germania in seguito alla guerra Europea. Part I: July 31, 1914, to July 31, 1915. Rome, 1916. 448 pp. (Series II, vol. 14, Part I.)*

The present volume gives the text of all economic and financial measures—laws, decrees, ordinances, circular orders, etc.—enacted in Germany between July 31, 1914, and July 31, 1915, on account of the European war.

JAPAN.—*Department of Finance. Sixteenth Financial and Economic Annual, 1916. Tokyo [1916]. 196 pp. Includes maps and diagrams.*

Part I is devoted to Finance; Part II to Agriculture, industry, and commerce; Part III to Foreign trade; Part IV to Banking and money market; Part V to Communications; Part VI to Chosen (Korea); Part VII to Taiwan (Formosa) and Karafuto (Japanese Saghalien). Gives a table showing 311,023 males and 503,366 females over the age of 14, and 318,667 males and 535,297 females under the age of 14 working in the factories in 1914. The average daily wage, according to the type of factory, ranged from 15 sen (7.3 cents) for boys under 14 to 71 sen (34.6 cents) for males over 14; and from 9 sen (4.4 cents) for girls under 14 to 14 sen (6.8 cents) for women over 14 years of age.

NETHERLANDS.—*Maandschrift van het Centraal Bureau voor de Statistiek. The Hague, 1916. Vol. 11, No. 11 (November 30).*

Contains usual current material on the labor market, unemployment insurance, prices, trade-unions, wage rates, labor legislation, etc.

NEW ZEALAND.—*Department of Labor. Awards, Recommendations, Agreements, etc., made under the Industrial, Conciliation, and Arbitration Act, for the year 1915. Vol. XVI. Wellington, 1916. clxiv, 840 pp.*

ONTARIO.—*Department of Agriculture. Annual report of the Bureau of Industries for the Province of Ontario, 1915. Toronto, 1916. 47 pp.*

The statistics deal entirely with agriculture.

QUEENSLAND.—*Department of Justice. Government Gazette. Workers' Compensation Regulations of 1916. [Brisbane,] Monday, 25th September, 1916. 19 pp.*

These regulations have been made in order to give full effect to the provisions and intention of the workers' compensation act of 1916; gives also a long table of rates of premium, by occupations, based on each £100 (\$486.65) paid in cash or its equivalent by way of wages, salaries, or other earnings by an employer to workers.

— *Department of Labor. Report of the Director of Labor and Chief Inspector of Factories and Shops, for year ended 30th June, 1916. Brisbane, 1916. 55 pp.*

The following summary, taken from the report, indicates the scope of the activities of the department:

Number of registered factories.....	2, 824
Number of shops with employees.....	3, 221
Number of shops without employees.....	3, 310
Number of employees in factories and shops.....	42, 966
Number of factory accidents reported (Brisbane).....	66
Number of industrial awards in operation.....	123
Overtime for year worked by females in Brisbane factories and shops (hours).....	45, 604
Overtime for year worked by males in Brisbane shops (hours).....	15, 498
Value of railway and steamer passes issued to workers.....	(£3,904 13s. 7d.) \$19, 031. 87
Amount refunded.....	(£2,831 19s. 10d.) \$13, 781. 89

Of those injured, 57 were males and 9 were females. Fifteen of the accidents occurred in engineering; most of them resulted in injury to the hands—approximately 58 per cent.

QUEENSLAND.—*Report of the Chief Inspector of Machinery and Scaffolding for the year ended 30th June, 1916. Brisbane, [1916] 8 pp.*

Notes among other things 1 fatal and 11 nonfatal accidents in connection with machinery.

— *The Workers' Compensation Act of 1916. [Brisbane, 1916] 23 pp.*

This is the text of the act which supersedes the workers' compensation act of 1905, the workers' compensation act amendment act of 1909, and the employers' liability acts, 1886 to 1888.

SOUTH AUSTRALIA.—*Chief Inspector of Factories. Report for the year ended December 31, 1915. Adelaide, September 18, 1916. 38 pp.*

There were at the end of the year 18,640 employees in 1,934 factories, a decrease of 2,655 employees over 1914. The hours of labor were generally 48 per week; 507 females worked approximately 9,112 hours overtime, and 37 males under 16 worked 630½ hours overtime. There were 121 accidents, 3 being fatal. The range of average wages was as follows:

Males under 16 years of age, 6s. (\$1.46) to 28s. (\$6.81).

Males over 16 and under 21, from 12s. (\$2.92) to 66s. (\$16.06).

Males over 21, from 45s. (\$10.95) to 104s. 7d. (\$26.18).

Females under 16, from 10d. (20.2 cents) to 17s. 3d. (\$4.20).

Females over 16 and under 21, from 9s. (\$2.19) to 21s. 8d. (\$5.17).

Females over 21, from 17s. 2d. (\$4.18) to 57s. (\$13.87).

SWEDEN.—*Sociala Meddelanden utgivna av K. Socialstyrelsen. Stockholm, 1916. No. 10.*

In addition to current reports on the labor market, prices, industrial accidents, factory inspection, etc., there are special articles on further reduction on the sale of alcohol, the three-shift system in the wood-pulp industry, and labor conditions in certain foreign countries.

UNOFFICIAL PUBLICATIONS RELATING TO LABOR.

AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE. *Annals. Vol. LXIX, Whole No. 158, January, 1917. The present labor situation. 302 pp. Editorial office, Woodland Avenue and Thirty-sixth Street, Philadelphia. Price, \$1.00.*

The scope of this issue is indicated by the following table of contents, the articles being presented under seven general heads. Part I. Certain aspects of the labor situation: Problem of railway trainmen's wages; case of railroad employees for an eight-hour day; issues in the street railway strike in New York City. Part II. Wages, working conditions, and hours of labor: Present trend of real wages; effects of the legal minimum wage for women; social insurance; welfare service for employees; better living conditions for employees and their relation to stability in employment; immigration and American labor; psychology of floating workers; hours of labor; maximum v. minimum hour legislation. Part III. Public employment bureaus; progress of the public employment bureaus; a Federal labor reserve board for the unemployed. Part IV. Some aspects of collective bargaining: Extent of trade-unionism; labor's share of the social product; doctrine that labor is a commodity; evolution of legal remedies as a substitute for violence and strikes. Part V. Compulsory arbitration or investigation before strikes or lockouts: Advantages and defects of compulsory arbitration; Canadian legislation concerning industrial disputes; attitude of organized labor toward the Canadian industrial disputes investigation act. Part VI. Voluntary arbitration and conciliation in private businesses: Trend of voluntary conciliation and arbitration in labor disputes; revised protocol in the

dress and waist industry; experience of Hart, Schaffner & Marx with collective bargaining; arbitration plan of William Filene's Sons Co.; methods of making local agreements employed by the Pattern Makers' Association of Chicago; shall free collective bargaining be maintained? Part VII. Fixing hours and wages in the railroads and other public utilities; Federal arbitration legislation; why I believe the Interstate Commerce Commission should have power to fix wages and hours of labor on interstate carriers; shall the Interstate Commerce Commission and the State public-utility commissions fix wages on the railroads and on local public utilities? legislation concerning the railroad service; railroad hours-of-labor law; attitude of the railroad brotherhoods toward hours of labor and wages; Government arbitration and mediation.

AMERICAN FEDERATION OF LABOR.—MICHIGAN BRANCH. *Industrial review*, 1916. 151 pp.

— *Proceedings of the 27th annual convention, Saginaw, September 19–23, 1916.* 65 pp.

— NEW JERSEY BRANCH. *Official proceedings of the 38th annual congress, Orange, August 21–23, 1916.* 62 pp.

ANDREWS, JOHN B. *Health Insurance. Address, May, 1916.* 13 pp.

This address, delivered by the secretary of the American Association for Labor Legislation, at the twelfth annual meeting of the National Association for the Study and Prevention of Tuberculosis, Washington, D. C., treats of the extent and cost of sickness, responsibility for sickness, inadequacy of existing health agencies, and the possibilities of health insurance. It also gives the history and discusses the principal provisions of the model bill for health insurance prepared by the committee on social insurance of the American Association for Labor Legislation in November, 1915, together with a consideration of the objections to the bill. The latest revision of this model bill will appear in Bulletin 212 of the Bureau, now in press, giving the proceedings of the Conference on Social Insurance, held in Washington, D. C., December 5–9, 1916.

ASSOCIAZIONE DEGLI INDUSTRIALI D'ITALIA PER PREVENIRE GLI INFORTUNI DEL LAVORO. *La prevenzione infortunii nelle fabbriche d'olio al solfuro. Note dell'ing. Mauro Rana. Milan, 1916.* 74 pp.

This booklet contains a description of safety devices for the prevention and avoidance of accidents in the handling of carbon bisulphide. In the manufacture of olive oil the olives are first pressed, and the oil extracted mechanically. The residues from the pressing process still contain 10 to 16 per cent of oil, which is extracted by means of a chemical solvent, carbon bisulphide. This is a very inflammable liquid, in the handling of which explosions occur frequently.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. *Committee on industrial fatigue. The question of fatigue from the economic standpoint. Second interim report. 1916.* 24 pp.

Contains sections on accumulated fatigue in warfare, daily course of fatigue in typesetting, fatigue as a cause of accidents, and applicability of psychology to problems of industrial fatigue. See MONTHLY REVIEW for December, 1916, p. 104, for brief review of this report.

CASSA DEGLI INVALIDI DELLA MARINA MERCANTILE. *Gestione speciale della cassa Nazionale di Previdenza per gli Operai. Rendiconto dell'esercizio 1914. Rome, 1916.* 65 pp.

— *Relazione del Direttore Generale sul rendiconto dell'anno 1914. Rome, 1916.* 55 pp.

The first of these two volumes gives a financial statement of the national invalidity fund of the merchant marine for the year 1914, and the second volume contains the annual report for the same year of the director general of the fund.

CASSA NAZIONALE DI MATERNITA. *Sezione autonoma della Cassa Nazionale di Previdenza per gli Operai. Rendiconto dell' esercizio 1914. Rome, 1916. 49 pp.*

Annual report for the year 1914 on the operation of the national maternity insurance fund.

CASSA NAZIONALE DI PREVIDENZA PER L'INVALIDITA E PER LA VECCHIAIA DEGLI OPERAI. *Rendiconto Generale dell' anno 1914. Rome, 1916. 97 pp.*

Contains a financial statement of the Italian National Old-age and Invalidity Insurance Fund for the year 1914. The contents will be discussed in a special article in the March number of the MONTHLY REVIEW.

CHAMBER OF COMMERCE OF THE UNITED STATES. *Committee on daylight saving. Report, 1916. 14 pp.*

— *Committee on the railroad situation. Report, 1916. 59 pp.*

This committee was appointed in February, 1916, to "impartially investigate and consider such phases of the critical [railroad] situation as relate to the interests of commerce and the public, and shall, from time to time, report to the board of directors as to the best means of preserving the public service unimpaired." The report covers the period from March 15, 1916, to July 29, 1916.

— *Referendum No. 19 (On the report of the railroad committee on the prevention of strikes and lockouts). Dec. 16, 1916. 13 pp.*

Gives the arguments pro and con on the report of the committee, submitted Dec. 11, 1916.

COMPENSATION INSPECTION RATING BOARD, NEW YORK. *Manager's 2d annual report for 1915. (Mimeographed.) 6 pp. Manager's 3d annual report for 1916. (Mimeographed.) 5 pp.*

CONFERENCE OF INDUSTRIAL PHYSICIANS. *Pennsylvania department of labor and industry. Feb. 17, 1916. Pennsylvania Medical Journal, Vol. 20, No. 1, Oct. 1916. Pp. 1-63.*

For a review of this conference see pages 267 to 272 of this number of the MONTHLY REVIEW.

CONSUMERS' LEAGUE OF THE CITY OF NEW YORK. *Twenty-five years of the Consumers' league of the city of New York. New York, 1916. 33 pp.*

Addresses at the anniversary dinner, Nov. 18, 1915.

DOS PASSOS, JOHN R. *The eight-hour law. 1916. 24 pp.*

An address before the New York County Lawyers' Association, Nov. 9, 1916.

EMPLOYERS' FEDERATION OF NEW SOUTH WALES. *Report of annual meeting, Nov. 16, 1916. 39 pp.*

FRANCKE, MARIE. *Opportunities for women in domestic science. Bulletin No. 2. Association of Collegiate Alumnae. 1916. 64 pp.*

The purpose of this study was to give to institutions of training, to occupational bureaus, and to all women who may desire to enter it vocationally, definite information concerning the field of domestic science. It described types of positions held by women in the profession of domestic science, and salaries received. It also shows the opportunities for training.

HALL, HERBERT J., AND BUCK, MERTICE, M. C. *Handicrafts for the handicapped. Illustrated. New York. Moffat. 1916. 155 pp. Price, \$1.25 net.*

This volume is intended as a text book of a few crafts which have proved to be of special value to handicapped workers. The directions given are elaborate

and detailed, so that the individual worker may be able to study out and practice a vocation for himself. There are chapters on basketry, chair seating, netting, weaving, book binding, cement working, pottery making, and light blacksmithing. An appendix gives a list of books on crafts and dealers in craft work supplies.

HARRIS, FRANKLIN S. *The young man and his vocation.* Boston, Badger, 1916. 204 pp.

This is an attempt to present a view of the opportunities in the leading occupations and to show the personal requirements and training desirable for those entering each of these occupations.

INSURANCE ECONOMICS SOCIETY OF AMERICA. *Bulletin 1, presenting an analysis of the plan proposed by the American Association for Labor Legislation, 16 pages; Bulletin 2, presenting a survey by health and accident underwriters of the only plan for social insurance so far submitted for public consideration, 11 pages; Bulletin 3, presenting a view of the extent to which compulsory health insurance would multiply State jobs and tax burdens, 12 pages; all by William Gale Curtis.*

INTERCOLLEGIATE DEBATES. Vol. 5, edited by E. R. Nichols. New York, Hinds, 1916. 567 pp.

Includes debates on the illiteracy test for restricting immigration and the injunction in labor disputes.

JONES, EDWARD D. *The administration of industrial enterprises with special reference to factory practice.* New York, Longmans, 1916. 442 pp.

"Throughout this book two things have been held in mind; to trace the application of the scientific method in industry and to point out the efficiency and the charm of an economic policy based upon welfare and service."

KEENE, G. A. *Profit and wages, a study in the distribution of income.* New York, MacMillan, 1916. 171 pp.

KIRKALDY, A. W., ED. *Labour, finance, and the war, being the results of inquiries, arranged by the section of economic science and statistics of the British Association for the Advancement of Science, during the years 1915 and 1916.* London, Pitman, 1916. 344 pp. Price, 3s. 6d.

Relates to reconstruction after the war, industrial unrest, replacement of men by women in industry, effects of the war on credit, currency and finance, and land settlement. This work will be reviewed at length in a future number of the MONTHLY REVIEW.

LOPEZ VALENCIA FEDERICO. *La acción patronal en el problema de los retiros obreros.* Instituto Nacional de Previsión. Madrid, 1913. 79 pp.

A prize essay on the benefits of paternalism in providing for the old-age retirement of workmen.

— *Las cajas de ahorros extranjeras en el regime de las casas barratas y de previsión popular.* Madrid, 1913. 15 pp.

A short treatise on the activities of foreign savings funds in workmen's housing and public welfare work.

LOTT, EDSON S. *Cost of employers' liability and workmen's compensation insurance.* 1913. 6 pp.

An article by the president of the United States Casualty Co., New York, reprinted from Cotton, Atlanta, Ga., January, 1913, issue.

— *Different methods of workmen's compensation insurance.* 1916. 14 pp.

An address before the Conference on Social Insurance, Washington, D. C., December 5-9, 1916. This address will appear in full in Bulletin 212 of this bureau, now in press, which gives a complete account of the proceedings of the convention.

MERCHANTS' ASSOCIATION OF NEW YORK. *For prevention of railroad strikes. Report of committee on public utilities. Also article on railroad strikes: Their menace and their lesson, by Henry R. Towne. 1916. 20 pp.*

— *Opposing Government ownership. November, 1916. 55 pp.*

MERRITT, WALTER GORDON, *associate counsel American Anti-Boycott Association. Domestic free trade and organized labor. 1916. 16 pp.*

MINNESOTA ACADEMY OF SOCIAL SCIENCES. *Papers and proceedings of the eighth annual meeting, 1915. 203 pp.*

The general topic of the papers was "Woman and the State." Special topics treated were: Minimum wage laws to date; educational work in institutions directed by the State board of control; mothers' pensions in theory and in legislation; Minnesota law for mothers' pensions and its operation; public allowances to dependent children of poor widows in Minnesota.

NATIONAL CONVENTION OF INSURANCE COMMISSIONERS. *Adjourned meeting. New York, Dec. 12, 1916. 46 pp.*

— *Proceedings of the forty-seventh session, Richmond, Va., September, 1916, of adjourned meetings in New York, Dec. 7, 1915, and in St. Louis, Mo., April 17, 1916. 297 pp.*

A statement of the social-insurance features of this convention appears in the MONTHLY REVIEW for November, 1916, pp. 615-623.

NATIONAL SAFETY COUNCIL. *Proceedings fifth annual safety congress, Detroit, October, 1916. 1541 pp.*

A digest of these proceedings will appear in a future number of the MONTHLY REVIEW.

NATIONAL UNION OF WOMEN WORKERS OF GREAT BRITAIN AND IRELAND. *Occasional paper No. 73. November, 1916. 36 pp.*

NEW ZEALAND EMPLOYERS' FEDERATION. *Official report of the annual meeting, 1916. 34 pp.*

SAGAMORE SOCIOLOGICAL CONFERENCE. *Ninth meeting, Sagamore Beach, June, 1916. Proceedings. 99 pp.*

The distinctive purpose of this conference, as stated by the president in his opening address, was to bring business men and business interests into contact with the social worker, the reformer, and the idealist, in order that the latter class may see some of the practical difficulties of the business man and that business men may find opportunity to widen their social vision. Special subjects treated were: What is the solution of our industrial and international problems, personal relationship in business administration, and educational requirements of modern industry.

SHILLADY, JOHN R. *Planning public expenditures to compensate for decreased private employment during business depressions. Mayor's committee on unemployment, New York, 1916. 29 pp.*

An address by the secretary of the mayor's committee on unemployment before the section on unemployment of the forty-third annual session of the National Conference of Charities and Correction, Indianapolis, May 16, 1916.

SNOWDEN, PHILIP. *Socialism and syndicalism. Baltimore. Warwick, 1915. 262 pp.*

TARBELL, IDA M. *New ideals in business, an account of their practice and their effects upon men and profits. New York, MacMillan, 1916. 339 pp.*

This book deals with the "new workshop," safety and the health movements, the campaign against the use of intoxicants, housing, hours and wages, ex-

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periments in finding just measure for value of service rendered, steadying the job, the factory as a school, our new industrial leader. It is essentially a book on welfare work.

UNSAIN, ALEJANDRO M. *Manual de la Legislacion Obrera Argentina. Buenos Aires, 1915. 311 pp.*

A manual of Argentine labor laws, containing commentaries on and the text of the existing labor laws.

WEBB, SIDNEY, and FREEMAN, ARNOLD. *Great Britain after the war. London, Unwin, 1916. 80 pp. Price, 1 shilling.*

An interesting discussion of what will happen after the war in regard to trade, employment, wages, prices, trade-unionism, cooperation, women's labor, foreign commerce, the railways, coal supply, education, taxation, etc. The authors call especial attention to the subject "Can we effect a revolution in our system of education?" and suggest that "failure to find an affirmative answer to that question will mean the frustration of the national hope of effective recovery from the war and of building up a civilization worth fighting for." A more extended notice of this work will appear in a future number of the MONTHLY REVIEW.

WISCONSIN UNIVERSITY (EXTENSION DIVISION). *Bulletin. The eye in industrial accidents, by Dr. Nelson M. Black. Madison, September, 1916. 27 pp.*

Contains information for workmen, shop foremen, and superintendents as to how to avoid injuries and meet emergencies in an intelligent manner, treated under the following headings: Accidents in which the eye is a factor, kinds of eye injuries, prevention of eye injuries, first-aid equipment for eye injuries, and first aid in eye injuries.

—— ——— *Vocational guidance series No. 1. Nursing as a vocation for women, by Katherine M. Olmsted. Madison, November, 1916. 19 pp.*

Deals with qualifications required in nursing, scope for training in hospital training schools, choosing the training school, accredited hospitals in Wisconsin, course of study, conditions of work in training school, opportunities, and remuneration.

WOMEN'S TRADE-UNION LEAGUE OF CHICAGO. *Annual report, June, 1915, to June, 1916. 31 pp.*

WORKMEN'S COMPENSATION PUBLICITY BUREAU. *Digest of workmen's compensation laws in the United States and Territories, with annotations. 1916 supplement revised to Nov. 1, 1916.*

PARTIAL LIST OF EMPLOYERS WHO ARE REPORTED TO HAVE ESTABLISHED SOME FORM OF WELFARE WORK.

ALABAMA.

Alabama City:
Dwight Manufacturing Co.
Bayview:
Tennessee Coal, Iron & Railroad Co.
Docena:
Tennessee Coal, Iron & Railroad Co.
Edgewater:
Tennessee Coal, Iron & Railroad Co.
Ensley:
Tennessee Coal, Iron & Railroad Co.
Fairfield:
American Steel & Wire Co.
Tennessee Coal, Iron & Railroad Co.
Kellerman:
Central Iron & Coal Co.
Lewisburg:
Alabama Co.
Mobile:
Mobile Light & Railroad Co.
Montgomery:
Montgomery Traction Co.
Republic:
Republic Iron & Steel Co.
Sayreton:
Republic Iron & Steel Co.

ARIZONA.

Globe:
Old Dominion Mining & Smelting Co.
Hayden:
American Smelting & Refining Co.
Jerome:
United Verde Copper Co.
Phoenix:
Pacific Gas & Electric Co.

ARKANSAS.

Bigelow:
Fourche River Lumber Co.
Crossett:
Crossett Lumber Co.

CALIFORNIA.

Chico:
Diamond Match Co.
Los Angeles:
Broadway Department Store.

CALIFORNIA—Concluded.

Los Angeles—Concluded.
Edison Electric Co.
Kellar-Thomason Manufacturing Co.
Letts Department Store.
Los Angeles Gas & Electric Co.
Sunset Telephone Co.
Oakland:
Taft & Penoyer (Inc.).
Richmond:
Pullman Co.
Standard Oil Co.
Sacramento:
Weinstock, Lubin & Co.
San Francisco:
The Emporium.
W. Friedman & Co.
Hale Bros.
Izard Dry Goods Co.
Nathan-Dohrmann Co.
Pacific Gas & Improvement Co.
Southern Pacific Railway.
Weinstock, Lubin & Co.

COLORADO.

Cokedale:
American Smelting & Refining Co.
Colorado Springs:
Portland Gold Mining Co.
Denver:
Colorado Fuel & Iron Co.¹
Colorado Midland Railroad Co.
Colorado Power Co.
Daniels & Fisher Stores Co.
Denver City Tramway Co.
Denver Fire Clay Co.
Denver Gas & Electric Co.
Denver Post.
Denver & Rio Grande Railroad Co.
A. T. Lewis & Sons' Dry Goods Co.
Durango:
Gold King Consolidated Mining Co.
Porter:
Porter Fuel Co.
Pueblo:
Colorado Fuel & Iron Co.

¹ The main office of this establishment is in this city; there are also branch offices in other localities.

COLORADO—Concluded.**Telluride:**

Colorado Fuel & Iron Co.

Trinidad:

Colorado Fuel & Iron Co.

CONNECTICUT.**Ansonia:**

Coe Brass Manufacturing Co.

Bridgeport:

American Tube & Stamping Co.

A. W. Burritt Co.

Remington Arms & Ammunition Co.

Wheeler & Wilson Manufacturing Co.

Bristol:

New Departure Co.

Hartford:

Colts Patent Firearms Manufacturing Co.

Hammond Typewriter Co.

Travelers' Insurance Co.

Underwood Typewriter Co.

Meriden:

International Silver Co.

New Haven:

Winchester Repeating Arms Co.

New York, New Haven & Hartford Railroad Co.

Norwalk:

Norwalk Mills Co.

South Manchester:

Cheney Bros.

Stamford:

Yale & Towne Lock Co.

Thompsonville:

Hartford Carpet Co.

Wallingford:

R. Wallace & Sons Manufacturing Co.

Waterbury:

American Brass Co.

Willimantic:

Willimantic Thread Co.

DELAWARE.**Wilmington:**

Atlas Powder Co.

Bancroft, Joseph & Sons Co.

Du Pont de Nemours Powder Co.¹

Electric Hose & Rubber Co.

Hercules Powder Co.

Hilles & Jones Co.

Lobdell Car Wheel Co.

Pusey & Jones Co.

Charles Warner Co.

DISTRICT OF COLUMBIA.**Washington:**

American Security & Trust Co.

S. Kann & Sons.

W. B. Moses & Sons.

The Norris Peters Co.

Parker, Bridget & Co.

Potomac Electric Power Co.

Southern Railway.

Washington Railway & Electric Co.

Washington Steel & Ordnance Co.

Woodward & Lothrop.

FLORIDA.**St. Augustine:**

Florida East Coast Railway Co.

GEORGIA.**Albemarle:**

Wiscassett Mill.

Atlanta:

Southern Bell Telephone Co.

Augusta:

Augusta Factory.

Enterprise Manufacturing Co.

John P. King Manufacturing Co.

Silbey Manufacturing Co.

Columbus:

Columbus Railroad Co.

Gainesville:

Pacolet Manufacturing Co.

Savannah:

Mutual Fertilizer Co.

Savannah Electric Co.

ILLINOIS.**Alton:**

Illinois Glass Co.

Western Cartridge Co.

Aurora:

Stephens-Adamson Manufacturing Co.

Western Wheeled Scraper Co.

Braceville:

Braceville Coal Co.

Breese:

Breese-Trenton Mining Co.

North Breese Coal & Mining Co.

Chicago:Adams Express Co.¹

Adams & Westlake Co.

Allis-Chalmers Co.

American Express Co.¹

American Steel & Wire Co.

Armour & Co.

¹ The main office of this establishment is in this city; there are also branch offices in other localities.

ILLINOIS—Continued.

Chicago—Continued.

Atlas Brewing Co.
 Brunswick-Balke Collender Co.
 Butler Bros.
 H. M. Byllesby & Co.
 G. B. Carpenter & Co.
 Carson, Pirie, Scott & Co.
 Chicago Bridge & Iron Co.
 Chicago City Railway Co.
 Chicago & Eastern Illinois Railroad.
 Chicago Malleable Castings Co.
 Chicago & Northwestern Railway Co.
 Chicago Retort & Fire Brick Co.
 Chicago Telephone Co.
 Commonwealth Edison Co.
 Consumers Refining Co.
 Corn Exchange National Bank.
 R. T. Crane Co.
 Croft & Reed.
 Elgin, Joliet & Eastern Railway Co.
 The Fair.
 Fairbanks-Morse Manufacturing Co.
 J. V. Farwell & Co.
 Fay-Soles Co.
 Marshall Field & Co.
 First National Bank of Chicago.
 Hart, Schaffner & Marx.
 Hibbard, Spencer, Bartlett & Co.
 Illinois Central Railroad Co.
 Illinois Publishing & Printing Co.
 International Harvester Co.
 B. Kuppenheimer & Co.
 Lakeside Press.
 Libby, McNeil & Libby.
 Link Belt Co.
 Mandell Bros.
 Metropolitan Trust & Savings Bank.
 Montgomery, Ward & Co.
 Morris Co.
 National Watch Co.
 People's Gas Light & Coke Co.
 Postal Telegraph & Cable Co.
 E. V. Price & Co.
 Rand, McNally & Co.
 Richie Paper Box Co.
 Rock Island Lines.
 Sears, Roebuck & Co.
 Siegel, Cooper & Co.
 Swift & Co.
 Tuthill Spring Co.
 Webster Manufacturing Co.

ILLINOIS—Concluded.

Chicago—Concluded.

Wells, Fargo & Co.¹
 Western Elevator Co.
 Wm. Wrigley, jr., Co.
 Union Pacific Railway Co.
 University of Chicago Press.

Coal City:

Wilmington Star Mining Co.

Decatur:

Mueller Manufacturing Co.

Duquoin:

Majestic Coke & Coal Co.

Edwardsville:

N. O. Nelson Manufacturing Co.

Elgin:

David C. Cook Publishing Co.

Elgin Watch Co.

Galesburg:

O. T. Johnson Co.

Granite City:

American Steel Foundries.

Commonwealth Steel.

National Enameling & Stamping Co.

National Lead Co.

Harvey:

Whiting Foundry Equipment Co.

Hawthorne:

Western Electric Co.

Joliet:

Illinois Steel Co.

La Salle:

Mattheissen & Hegeler Zinc Co.

Moline:

Deere & Co.

Moline Plow Co.

Moline Wagon Co.

Velie Motor Vehicle Co.

Pekin:

Pekin Cooperage Co.

Peoria:

The Avery Co.

Chicago Manufacturing Co.

Pullman:

Puliman Palace Car Co.

Rock Falls:

Cobb & Drew.

Rockford:

Barber-Coleman Co.

Eclipse Gas Stove Co.

Hess & Hopkins Leather Co.

¹ The main office of this establishment is in this city; there are also branch offices in other localities.

INDIANA.

Anderson:
 American Steel & Wire Co.
 Remy Electric Co.

Evansville:
 Baker Manufacturing Co.
 Blount Plow Works.

Fort Wayne:
 Boss Manufacturing Co.
 Wayne Knitting Mills.

Gary:
 American Bridge Co.
 American Sheet & Tin Plate Co.
 Elgin, Joliet & Eastern Railway Co.
 Illinois Steel Co.
 Indiana Steel Co.
 U. S. Coal & Coke Co.

Indiana Harbor:
 Inland Steel Co.

Indianapolis:
 E. C. Atkins & Co.
 Atlas Engine Works.
 Ayres Department Store.
 Kahn Tailoring Co.
 N. Lieber Co.

Kokomo:
 Great Western Pottery Co.

Mishawaka:
 Dodge Manufacturing Co.
 Mishawaka Woolen Manufacturing Co.

Muncie:
 Ball Bros. Glass Manufacturing Co.
 Boss Manufacturing Co.

Newcastle:
 Maxwell Motor Co.

South Bend:
 Oliver Chilled Plow Works.
 Studebaker Manufacturing Co.

IOWA.

Charles City:
 Hart-Parr Co.

Davenport:
 French & Hecht Co.

Dubuque:
 Chicago, Milwaukee & St. Paul Railway Workshops.

Fort Dodge:
 Green-Wheeler Shoe Co.

Grinnell:
 Morrison, McIntosh & Co.

Fort Madison:
 Morrison Manufacturing Co.

KANSAS.

Neodesha:
 Standard Oil Co.

Topeka:
 Atchison, Topeka & Santa Fe Railroad Co.

KENTUCKY.

Ashland:
 Ashland Iron & Mining Co.

Benham:
 Wisconsin Steel Co.

Covington:
 South Covington & Cincinnati Railway Co.

Louisville:
 Ahrens & Ott Manufacturing Co.
 B. F. Avery & Sons.
 Ballard & Ballard Co.
 Embury Box Co.
 Kentucky Wagon Manufacturing Co.
 Louisville Cotton Mill Co.
 Louisville Railway.
 Standard Sanitary Manufacturing Co.

Newport:
 Wideman Brewing Co.

LOUISIANA.

New Orleans:
 Cosmopolitan Hotel Co.
 Leon Godchaux Clothing Co.
 N. O. Nelson Manufacturing Co.
 New Orleans Railway & Light Co.

MAINE.

Bangor:
 Eastern Manufacturing Co.

Cumberland Mills:
 Warren & Co.

Lewiston:
 Great Department Store.

Portland:
 Eastman Bros. & Bancroft.
 Maine Central Railroad Co.

Westbrook:
 Cumberland Mills.

MARYLAND.

Baltimore:
 Baltimore & Ohio Railroad Co.
 Edwin Bennett Pottery Co.
 Consolidated Gas, Electric Light & Power Co.
 Davis Coal & Coke Co.
 Detroit & Harvey Machine Co.
 Wm. Knabe Co.

MARYLAND—Concluded.**Baltimore—Concluded.**

Lerch Bros.
 Morris & Co.
 H. Rothschild, Kohn & Co.
 Sonneborn, Henry & Co.
 United Railways & Electric Co.
 Weems Steamboat Co.

Sparrow Point:

Pennsylvania Steel Co.

MASSACHUSETTS.**Athol:**

Athol Machine Co.

Beverly:

United Shoe Machinery Co.

Boston:

American Felt Co.
 American Soda Fountain Co.
 Walter Baker & Co.
 Bemis Bros.
 Booth Mills.
 Boston & Albany Railroad Co.
 Boston Confectionery Co.
 Boston Elevated Railway Co.
 Boston Globe Newspaper Co.
 Boston Herald.
 Boston & Maine Railroad Co.
 Boston Manufacturing Co.
 Boston, Revere Beach & Lynn Railroad Co.
 Boston Rubber Shoe Co.
 Boston Telephone Co.
 Boston Transcript.
 Boston Woven Hose & Rubber Co.
 Brown, Durrell & Co.
 Chandler & Co.
 Davidson Rubber Co.
 Edison Electric Illuminating Co.
 Eureka Silk Manufacturing Co.
 William Filene's Sons Co.
 Gilchrist Co.
 Goodhue, Studley & Emery.
 James A. Houston Co.
 Jordan Marsh Co.
 Loose-Wiles Biscuit Co.
 Lowney Co.
 McGrane & Houston Co.
 New England Confectionery Co.
 New England Telephone & Telegraph Co.
 Thomas G. Plant Co.
 Pocasset Worsted Co.
 John H. Pray & Sons Co.

MASSACHUSETTS—Continued.**Boston—Concluded.**

Samoset Chocolates Co.
 Schrafft & Sons.
 Shepard Norwell Co.
 Simplex Electrical Co.
 Stone & Webster.
 United Fruit Co.
 Waitt & Bond Co.
 Walker & Pratt Manufacturing Co.
 George F. Willett Co.
 S. A. Woods Machine Co.

Brockton:

W. L. Douglas Shoe Co.
 G. E. Keith Co.

Cambridge:

Boston Bridge Works.
 Boston Confectionery Co.
 Boston Woven Hose & Rubber Co.
 Library Bureau.
 Houghton, Mifflin & Co.

Chelsea:

Forbes Lithographic Co.

Chicopee Falls:

Fisk Rubber Co.

Dorchester:

Walter Baker & Co.

East Cambridge:

Boston Bridge Works.
 Ginn & Co.

East Walpole:

Bird & Son.

Easthampton:

Glendale Elastic Fabric Co.

Everett:

Cochrane Chemical Co.

Fall River:

Bourne Mills.
 Brown Cotton Mills.
 Durfee Mills.
 Kerr Thread Mills.
 King Philip Mills.

Fitchburg:

Crocker-Burbank Paper Co.
 Fitchburg & Leominster Street Railway Co.
 Simonds Manufacturing Co.

Framingham:

Dennison Manufacturing Co.

Greenfield:

Greenfield Tap & Die Co.
 Goodell-Pratt Co.
 Wells Bros. Co.

MASSACHUSETTS—Continued.

Haverhill:
Emery & Marshall.
Haverhill Electric Co.

Holyoke:
National Blank Book Co.
Taylor-Burt Co.

Hopedale:
The Draper Co.

Hyde Park:
B. F. Sturtevant Co.

Indian Orchard:
Chapman Valve Manufacturing Co.

Ludlow:
Ludlow Manufacturing Associates.

Lynn:
J. B. Blood Co.
Faunce & Spinney.
A. E. Little & Co.

Lawrence:
American Woolen Co.
Pacific Mills.

Lowell:
J. C. Ayer Co.
Bigelow Carpet Co.
Boott Mills.
Merrimac Manufacturing Co.
Patterson Rubber Co.
Saco-Lowell Shops.
United States Cartridge Co.

Malden:
Boston Rubber Shoe Co.
Converse Rubber Co.
Malden & Melrose Gas Light Co.

Mansfield:
Lowney Chocolate Co.

Milford:
Milford Shoe Co.
Regal Shoe Co.

New Bedford:
Howland Mills Corporation.
Union Street Railway Co.

North Billerica:
Talbot Mills.

North Chelmsford:
Silesia Mills.

North Easton:
Oliver Ames & Sons.

North Plymouth:
Plymouth Cordage Co.

Norwood:
Berwick & Smith.
Plimpton Press.

MASSACHUSETTS—Concluded.

Pittsfield:
Simonds Manufacturing Co.
Stanley Electric Co.

Quincy:
Fore River Shipbuilding Co.

South Hadley Falls:
Hampshire Paper Co.

Spencer:
Spencer Wire Co.

Springfield:
Milton Bradley Co.
Burt-Logan Co.
Chandler & Co.
National Blank Book Co.
Smith & Wesson.

Waltham:
Waltham Watch Co.

Watertown:
Walker & Pratt Manufacturing Co.

Westfield:
Westfield Manufacturing Co.

West Lynn:
General Electric Co.

Whitinsville:
Whitin Machine Works.

Whitman:
Regal Shoe Co.

Worcester:
Crompton & Knowles.
Norton Co.
Osgood, Bradley & Sons.
Royal Worcester Co.
United States Envelope Co.

MICHIGAN.

Battle Creek:
Postum Cereal Co.
Battle Creek Paper Co.
Advance Thresher Co.

Benton Harbor:
Lakurba Cigar Co.

Cadillac:
Cadillac Manufacturing Co.

Calumet:
Calumet & Hecla Mining Co.¹

Detroit:
Acme White Lead & Color Works.
American Flower Co.
American Radiator Co.
Anderson Electric Car Co.
Bolles Iron & Wire Works.
Brown Bros.

¹ The main office of this establishment is in this city; there are also branch offices in other localities.

MICHIGAN—Continued.**Detroit—Concluded.**

Burroughs Adding Machine Co.
 Calvert Lithographing Co.
 Chalmers Motor Co.
 Detroit Free Press.
 Detroit Insulated Wire Co.
 Detroit & Mackinac Railroad Co.
 Detroit Stove Works.
 Detroit United Railway.
 Dodge Bros.
 Farrand Organ Co.
 W. M. Fink & Co.
 Ford Automobile Co.
 J. L. Hudson Co.
 Michigan Bolt & Nut Works.
 Michigan Stove Co.
 Packard Motor Car Co.
 Parke, Davis & Co.
 Pere Marquette Railway Co.
 Stearns & Co.
 Studebaker Co.
 Timken-Detroit Axle Co.
 Wolverine Manufacturing Co.

Flint:

Buick Motor Co.
 Durant-Dort Carriage Co.
 Flint Vehicle Works.
 Michigan Motor Castings Co.
 Oak Park Power Co.
 Weston-Mott Co.

Grand Rapids:

Baxter Laundry Co.
 Bissell Carpet Sweeper Co.
 Brown & Sehler Co.
 Clipper Belt Lacer Co.
 Fuller & Rice Lumber & Manufacturing Co.
 Grand Rapids Railway Co.
 Grand Rapids Refrigerator Co.
 Macey Co.
 Nelson-Matter Furniture Co.
 Phoenix Furniture Co.
 Royal Furniture Co.
 O. & W. Thum Co.
 Wallin Leather Co.
 Wolverine Brass Works.

Ionia:

Pere Marquette Railroad.

Iron Mountain:

Oliver Iron Mining Co.
 Pickands, Mather & Co.

MICHIGAN—Concluded.**Ishpeming:**

Cleveland-Cliffs Iron Co.
 Oliver Iron Mining Co.

Jackson:

American Fork & Hoe Co.
 L. H. Field Co.
 Withington & Cooley Manufacturing Co.

Lansing:

Lansing Co.
 New Way Motor Co.
 Prudden Co.

Monroe:

River Raisin Paper Co.

Muskegon:

Alaska Refrigerator Co.

Painesdale:

Champion Copper Co.

Republic:

Republic Iron & Steel Co.

Saginaw:

Mershon, Schnette, Parker & Co.

Trimountain:

Trimountain Mining Co.

MINNESOTA.**Coleraine:**

Oliver Iron Mining Co.

Crosby:

Inland Steel Co.

Duluth:

Duluth & Iron Range Railroad Co.
 Duluth Missabe & Northern Railway Co.
 Minnesota Steel Co.
 Republic Iron & Steel Co.

Ely:

Oliver Iron Mining Co.

Gilbert:

Pickands, Mather & Co.

Minneapolis:

Dayton Co.
 Minneapolis, St. Paul & Sault Ste. Marie Railway Co.
 Minneapolis Steel & Machinery Co.
 North Star Woolen Mills Co.
 Northwestern Knitting Co.
 Northwestern National Bank.
 Pillsbury Flour Mills Co.
 Pittsburg Plate Glass Co.
 Security National Bank.

MINNESOTA—Concluded.**Minneapolis—Concluded.**

Washburn-Crosby Co.
Winston, Harper & Fisher Co.

St. Paul:

American Hoist & Derrick Co.
Brown & Bigelow.
Chicago, St. Paul, Minneapolis &
Omaha Railway.
Foot-Schule & Co.
Great Northern Railway Co.
International Harvester Co.
Northern Pacific.
G. Sommers & Co.
Twin City Rapid Transit.

Virginia:

Pitt Iron Mining Co.

MISSISSIPPI.**Starkville:**

Stone Cotton Mills.

MISSOURI.**Kansas City:**

Armour & Co.
Bemis Bro. Bag Co.
Burnham-Munger-Root Dry Goods Co.
Emery-Bird-Thayer Dry Goods Co.
Fidelity Trust Co.
Gillpatrick's Laundry.
Jones Dry Goods Co.
Kansas City Home Telephone Co.
Kansas City Light & Power Co.
Kansas City Railways Co.
Loose-Wiles Biscuit Co.
Missouri & Kansas Telephone Co.
Montgomery, Ward & Co.
National Biscuit Co.
George B. Peck Dry Goods Co.
Silver Laundry Co.
John Taylor Dry Goods Co.

St. Louis:

Ames Shovel & Tool Co.
T. Arthur Anderson Laundry Co.
Bemis Bro. Bag Co.
Commonwealth Steel Co.
Crunden-Martin Manufacturing Co.
Famous & Barr Co.
Grand Leader.
Huttig Sash & Door Co.
Hygienic Chemical Co.
National Bank of Commerce.
N. O. Nelson Manufacturing Co.
Pfeiffer Chemical Co.

MISSOURI—Concluded.**St. Louis—Concluded.**

Scruggs-Vandervoort-Barney Dry
Goods Co.
Southwestern Telephone & Telegraph
Co.
Stix, Baer & Fuller Co.
St. Louis Mazda Lamp Co.
St. Louis Smelting & Refining Co.
Union Electric Manufacturing Co.
Wagner Electric Manufacturing Co.

MONTANA.**Anaconda:**

Anaconda Copper Mining Co.

Butte:

United Verde Copper Co.

NEBRASKA.**Lincoln:**

The Spirella Co.

Omaha:

Union Pacific Railroad Co.

NEW HAMPSHIRE.**Amoskeag (Manchester):**

Amoskeag Manufacturing Co.

Concord:

Page Belting Co.

Dover:

J. B. Williams & Sons.

NEW JERSEY.**Ampere:**

Crocker-Wheeler Co.

Arlington:

Arlington Co.

Bayonne:

Bressler Bros

Tide Water Oil Co.

Belleville:

Rogers Wire Works.

Bloomfield:

Westinghouse Lamp Co.

Bound Brook:

Standard Paint Co.

Bridgeton:

Cumberland Glass Manufacturing Co.

Camden:

Campbell Soup Co.

Croft, Howland Sons & Co.

Farr & Bailey Co.

Hunt Pen Co.

Keystone Leather Co.

Victor Talking Machine Co.

R. D. Wood & Co.

NEW JERSEY—Continued.

Carleton Hill:
 Standard Bleachery Co.
 Carlstadt:
 S. Kleber & Co.
 Dover:
 Ulster Iron Works.
 H. S. Peters.
 Elizabeth:
 American Swiss File & Tool Co.
 Samuel L. Moore & Sons Corporation.
 Elizabethport:
 Hygienic Chemical Co.
 Singer Manufacturing Co.
 Florence:
 R. D. Wood & Co.
 Franklin:
 New Jersey Zinc Co.
 Gillsboro:
 John Lucas & Co.
 Gloucester City:
 Welsbach Co.
 Hackensack:
 Hackensack National Bank.
 Hackensack Trust Co.
 People's National Bank.
 Harrison:
 Driver-Harris Wire Co.
 General Electric Lamp Works.
 Marine Engine & Machine Co.
 High Bridge:
 Taylor-Wharton Iron & Steel Co.
 Hoboken:
 W. C. Baker.
 Beck Bros.
 W. D. Forbes.
 Keuffel & Esser Co.
 New York Switch & Crossing Co.
 Raudnitz & Pollitz.
 Jersey City:
 Colgate & Co.
 Gibson Iron Works Co.
 L. O. Koven & Bros.
 P. Lorillard Co.
 Riegel Sack Co.
 Royal Cocoa Co.
 Kinkora:
 J. A. Roebling's Sons Co.
 Long Branch:
 Edward Lumber & Coal Co.
 Mahwah:
 American Brake Shoe & Foundry Co.
 Millville:
 R. D. Wood & Co.

NEW JERSEY—Continued.

Mt. Hope:
 Empire Steel & Iron Co.
 Newark:
 Carter, Howe & Co.
 The Celluloid Co.
 Clark Mile End Spool Cotton Co.
 Clark Thread Co.
 Day, Clark & Co.
 Feigenspan Brewing Co.
 Ferris Bros. Co.
 L. Goldsmith & Son.
 Gould & Eberhardt.
 Johnston & Murphy Shoe Co.
 Murphy Varnish Co.
 Mutual Benefit Co.
 National Saw Co.
 Novelty Wood Works.
 Prudential Life Insurance Co.
 Public Service Corporation of New Jersey.
 Roebling Iron Works.
 Spratt's Patent (America).
 Stewart Hartshorn Co.
 Western Electrical Instrument Co.
 Newton:
 Valentine & Bentley Silk Co.
 Passaic:
 Brighton Mills.
 J. L. Prescott.
 B. G. Volger Manufacturing Co.
 Paterson:
 American Locomotive Co.
 German-American Trust Co.
 Julius Brandes Manufacturing Co.
 National Silk Dyeing Co.
 Rogers Locomotive Co.
 Second National Bank.
 Silk City Safe Deposit Co.
 Standard Silk Dyeing Co.
 Perth Amboy:
 Perth Amboy Dry Dock Co.
 Perth Amboy Terra Cotta Co.
 Raritan Copper Works.
 Roessler & Hasslacher Chemical Co.
 Phillipsburgh:
 Ingersoll-Rand Co.
 Plainfield:
 Potter Printing Press Co.
 Pompton:
 Ludlum Steel & Spring Co.
 Salem:
 Ayers Machine Co.

NEW JERSEY—Concluded.**Sayreville:**

Sayre & Fisher Co.

Trenton:

John Maddock & Sons.

New Jersey & Pennsylvania Traction Co.

Reeves Engine Co.

J. A. Roebling's Sons Co.

The Trenton Potteries Co.

Union:

Clifton Silk Mills.

Waverly Park:

Weston Electrical Instrument Co.

NEW YORK.**Albany:**

Consolidated Car Heating Co.

F. C. Huyck & Sons.

John G. Myers Co.

New York Telephone Co.

Auburn:

Dunn & McCarthy Shoe Factory.

International Harvester Co.

Binghamton:

Dunn & McCarthy.

Briarcliff Manor:

Briarcliff Farms.

Brooklyn:

Abraham & Straus.

Brennon & White.

Brooklyn City Safe Deposit Co.

Brooklyn Daily Eagle.

Brooklyn Navy Yard.

Brooklyn Rapid Transit Co.

Brooklyn Trust Co.

Bush Terminal.

Robert Cair Co.

Chelsea Mills.

Eberhard Faber Pencil Co.

Edison Electric Illuminating Co.

Ess-Arr Knitting Works.

Iron Clad Manufacturing Co.

Kenyon Co.

Frederick Loeser & Co.

Mergenthaler Linotype Co.

Pilgrim Laundry.

J. N. Robins Co.

J. H. Williams & Co.

Buffalo:

Acme Steel & Malleable Iron Works.

Barcalo Manufacturing Co.

Buffalo Scale Co.

Buffalo Smelting Co.

NEW YORK—Continued.**Buffalo—Concluded.**

F. H. Burt Co.

Jacob Dold Packing Co.

William Hengerer & Co.

Houk Manufacturing Co.

International Railway Co. System.

Lackawanna Steel Co.

Larkin Soap Co.

Lehigh Valley Railroad Co.

Pierce-Arrow Motor Car Co.

Pratt & Letchworth.

Shephard, Sidney & Co.

Thomas Motor Co.

Western Union Telegraph Co.

Canajoharie:

Beechnut Packing Co.

Canandaigua:

Lisk Manufacturing Co.

Chadwick:

Willowvale Bleachery.

Chautauqua:

Chautauqua Traction Co.

Cohoes:

Harmony Mills.

Tivoli Mills.

Cortland:

Wickwire Bros.

Dolgéville:

A. Dolge & Son.

East Aurora:

The Roycrofters.

Endicott:

Endicott, Johnson & Co.

Garden City:

Doubleday, Page & Co.

Geneva:

Geneva Optical Co.

Standard Optical Co.

Gloversville:

Fonda, Johnstown & Gloversville Railroad.

Ilion:

Remington Typewriter Co.

Remington Arms Co.

Mechanicsville:

Mechanicsville Knitting Co.

Middletown:

Howell-Herschman Co.

Mineville (Essex County):

Witherbee-Sherman Co.

Newburgh:

Orange County Traction Co.

NEW YORK—Continued.

New York City:

Adams Electric Co.
 B. Altman & Co.
 American Bank Note Co.
 American Book Co.
 American Brake Shoe & Foundry Co.¹
 American Can Co.¹
 American Colortype Co.
 American Dock Co.
 American Express Co.¹
 American Iron & Steel Institute.
 American Light & Traction Co.
 American Lithographic Co.
 American Locomotive Co.¹
 American Manufacturing Co.
 American Smelting & Refining Co.¹
 American Sugar Refining Co.
 American Telephone & Telegraph Co.
 and allied companies.
 American Tobacco Co.¹
 American Woolen Co.¹
 Bankers' Trust Co.
 Barber & Co.
 Bloomingdale Bros.
 Borden Condensed Milk Co.
 Brady & Guion (Inc.).
 Brewster & Co.
 Butterick Pattern Co.
 Cammeyer.
 Central Brewing Co.
 Century Publishing Co.
 Chelsea Mills.
 Consolidated Gas Co.
 Consumers Brewing Co.
 Crescent Watch Case Co.
 Delaware, Lackawanna & Western
 Railroad Co.
 The Delaware & Hudson Co.
 Eaton, Cole & Burnham Co.
 Equitable Life Insurance Co.
 Erie Railroad.
 Fifth Avenue Bank.
 First National Bank.
 Floersheimer Bros.
 Gas Engine & Power Co.
 General Acoustic Co.
 General Chemical Co.¹
 Gimbel Bros.
 J. J. Goldman.
 Greenhut & Co.
 Hamburg-American Line.

NEW YORK—Continued.

New York City—Continued.

Herring-Hall-Marvin Safe Co.
 Hill Publishing Co.
 R. Hoe & Co.
 Hogan & Sons.
 Hotel Astor.
 Hotel Belmont.
 Hotel McAlpin.
 Huyler Candy Co.
 Interborough Rapid Transit Co.
 International Mercantile Marine Co.
 J. H. Keiser (Inc.).
 C. F. Koch & Co.
 Long Island Railroad Co.
 Lord & Taylor.
 P. Lorillard Tobacco Co.¹
 MacMillan Co.
 McClure Publishing Co.
 James McCreery & Co.
 McNutt Can Co.
 R. H. Macy & Co.
 Manning, Maxwell & Moore.
 A. D. Matthews' Sons.
 Metropolitan Life Insurance Co.
 Minot, Hooper & Co.
 A. I. Namm & Son.
 National Bank of Commerce.
 National Biscuit Co.¹
 National City Bank.
 National Cloak & Suit Co.
 National Lead Co.¹
 Nemo Corset Co.
 New York Central Railroad Co.
 New York Edison Co.
 New York Evening Post.
 New York Life Insurance Co.
 New York National Bank.
 New York Telephone Co.
 New York Transfer Co.
 North German-Lloyd Steamship Co.
 North Star Mines Co.¹
 Old Dominion Steamship Co.
 Otis Elevator Co.
 Overseas Shipping Co.
 Pennsylvania Railroad Co.
 Postal Telegraph Co.¹
 Republic Rubber Tire & Shoe Co.
 Rothenberg & Co.
 S. Scheuer & Sons.
 Charles L. Seabury & Co.
 D. E. Sicher & Co.

¹ The main office of this establishment is in this city; there are also branch offices in other localities.

NEW YORK—Continued.

New York City—Concluded.

Smith & Kaufman.
 Standard Oil Co.¹
 Staten Island Rapid Transit Co.
 Steinway & Sons.
 Stollwerck Bros.
 J. F. Tapley.
 Tide Water Oil Co.¹
 Union Pacific Railway Co.
 United Cigar Stores Co.
 United States Steel Corporation and
 various subsidiary companies.
 Vogue Publishing Co.
 Wallach's Laundry.
 John Wanamaker.
 Ward Baking Co.¹
 L. E. Waterman Co.
 Wells, Fargo & Co.
 Westcott Express Co.
 Western Electric Co.¹
 Western Union Telegraph Co.
 J. H. Williams Co.
 Wynkoop, Hollenbeck, Crawford Co.

Niagara Falls:

Carborundum Co.
 Natural Food Co.
 Niagara Falls Development Co.
 Niagara Falls Power Co.
 Oneida Community (also at Oneida).
 Shredded Wheat Co.
 The Spirella Co.

Oneida:

Oneida Community.
 Wm. Rogers Co.

Peekskill:

Fleischmann Yeast Co.¹
 Union Stove Works.

Port Chester:

Ernest Simon Manufacturing Co.
 Russell, Burdsall & Ward Bolt & Nut
 Co.

Rochester:

Adler Bros. & Co.
 Bausch & Lomb Optical Co.
 Brownell Motor Car Co.
 Duffy, McInnerney Co.
 Eastman Kodak Co.
 German-American Button Co.
 H. B. Graves.
 Rochester Herald.
 Rochester Railway Co.
 M. B. Schautz.

NEW YORK—Concluded.

Rochester—Concluded.

Sibley, Lindsay & Curr Co.
 Stromberg-Carlson Telephone Manu-
 facturing Co.
 Swiss Laundry.
 Taylor Instrument Co.

Salamanca:

Salamanca Trust Co.

Saugerties:

Saugerties Manufacturing Co.

Schenectady:

General Electric Co.¹

Seneca Falls:

Gould Manufacturing Co.

Syracuse:

A. E. Nettleton Co.
 Onondaga Pottery Co.
 Pierce, Butler & Pierce.
 Solvay Process Co.
 E. C. Stearnes & Co.
 Syracuse Chilled Plow Co.
 Syracuse City Bank.
 Waldorf Manufacturing Co.

Utica:

Hart & Crouse Co.
 Mohawk Valley Cup Co.
 Utica Drop Forge & Tool Co.

Watertown:

St. Regis Paper Co.
 Taggart Paper Co.

Troy:

Beatties Laundry.
 Burden Iron Co.
 Cluett, Peabody & Co.
 Earl & Wilson Co.
 W. & L. E. Gurley.
 Wright Health Underwear Co.

Warrensburg:

Emerson Manufacturing Co.

Yonkers:

Otis Elevator Co.
 Alexander Smith & Sons Carpet Co.
 John T. Waring Hat Manufacturing Co.

NORTH CAROLINA.

Canton:

Champion Fiber Co.

Greensboro:

American Cigar Co.
 Proximity Manufacturing Co.

McAdenville:

McAden Mills.

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NORTH CAROLINA—Concluded.

Spray:

Spray Cotton Mills.

Wilmington:

Atlantic Coast Line Railroad.

OHIO.

Akron:

Aultman & Miller Buckeye Co.

Firestone Co.

B. F. Goodrich Co.

Goodyear Tire & Rubber Co.

Miller Rubber Co.

Quaker Oats Co.

Webster Camp & Lane Co.

Alliance:

Morgan Engineering Co.

Barberton:

Columbia Chemical Co.

Diamond Match Co.

Canton:

Berger Manufacturing Co.

Republic Stamping & Enameling Co.

Cincinnati:

American Book Co.

Bell Telephone Co.

Chicago, Cleveland, Cincinnati, & St.

Louis Railroad Co.

Cincinnati, Hamilton & Dayton Rail-
road Co.

Cincinnati Milling Machine Co.

Cincinnati Suburban Telephone Co.

Cincinnati Traction Co.

Desmond's Lace Store.

The Fair.

Globe-Wernicke Co.

Henderson Lithographic Co.

The Lodge & Shipley Machine Tool
Co.

Lunkenheimer Co.

McAlpin Co.

Model Laundry.

Proctor & Gamble Co.

Rookwood Pottery.

Rough & Mack Shirt Co.

Smith Kasson Co.

Strobridge Lithographic Co.

United States Playing Card Co.

Cleveland:

Acme Machine Co.

American Ship Building Co.

American Steel & Wire Co.

American Washboard Co.

OHIO—Continued.

Cleveland—Continued.

The Bailey Co.

Bell Telephone Co.

Benton, Myers & Co.

H. Black & Co.

Brown Hoisting Machine Co.

Chandler & Rudd.

Cleveland-Akron Bag Co.

Cleveland Automatic Machine Co.

Cleveland Axle Manufacturing Co.

Cleveland-Canton Springs Co.

Cleveland Electric Illuminating Co.

Cleveland Electric Railway Co.

Cleveland Foundry Co.

Cleveland Hardware Co.

Cleveland Provision Co.

Cleveland Punch & Shear Co.

Cleveland State Telephone Co.

Cleveland Terminal & Valley Rail-
road Co.

Cleveland Twist Drill Co.

Cleveland Worsted Mills.

Crow & Whitmarsh.

Davis Laundry Co.

First National Bank.

Formann-Bassett Co.

Garlock-Frazee Laundry Co.

Glidden Varnish Co.

Halle Bros.

The Hall-Van Gorden Co.

Hydraulic Pressed Steel Co.

Independent Telephone Co.

Joseph & Feiss.

Kaynee Co.

Kelley Island Lime & Transport Co.

Lake Carriers' Association.

Lake Erie Iron Co.

May Co.

Mechanical Rubber Co.

Morris Coal Co.

National Carbon Co.

National Electric Lamp Co.

New York, Chicago & St. Louis Rail-
road Co.

The Osborn Manufacturing Co.

Otis Steel Co.

Pickands, Mather & Co.¹

Printz-Biederman Co.

Provident Coal Co.

Republic Rubber Co.

River Furnace Co.

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OHIO—Continued.

Cleveland—Concluded.

Sherwin-Williams Co.
W. P. Southworth Co.
Standard Sewing Machine Co.
William Taylor, Son & Co.
Upson Nut Co.
Warner & Swasey.
White Sewing Machine Co.
Winton Automobile Co.

Columbus:

Buckeye Steel Castings Co.
Case Manufacturing Co.
Capital City Dairy Co.
Central Union Telephone Co.
Columbus Iron & Steel Co.
Columbus Oilcloth Co.
Columbus Railway Co.
Dunn, Taft & Co.
Federal Glass Co.
H. C. Goodman Co.
Green, Joyce Co.
Hanna Paint Co.
Hocking Valley Railroad Co.
Humpton-Scott Co.
Jeffrey Manufacturing Co.¹
Kilbourne & Jacobs Manufacturing Co.
M. B. Lilley & Co.
Pittsburg Coal Co.
J. Edwin Smith Co.
Troy Laundry Co.
Z. S. White Co.
Winslow Glass Co.

Cortland:

Sperry Manufacturing Co.

Dayton:

Buckeye Iron & Brass Works.
Central Union Telegraph Co.
Dayton Engineering Laboratories.
Kinnard Manufacturing Co.
Legler Co.
Lowe Bros. Co.
National Cash Register Co.
Platt Iron Works.
Recording & Computing Machine Co.
Rike-Cumler Co.
Stillwell-Bierce & Smith-Vaille Co.
Thomas Manufacturing Co.
Weinrich Cigar Factory.

Delaware:

New York Cash Store.

OHIO—Continued.

East Liverpool:

Knowles, Taylor & Knowles Co.
Smith & Phillips China Co.
Standard Pottery Co.
Wells Clark China Co.

Elyria:

Willys-Overland Co.

Fostoria:

Allen Motor Co.

Hamilton:

Champion Coated Paper Co.

Hughesville:

Williamsport & North Branch Railroad Co.

Ivorydale:

Procter & Gamble.

Lancaster:

Fairfield Shoe Co.
Goodman Shoe Co.
Lancaster Shoe Co.

Lockland:

Stearns & Foster Co.

Lorain:

Lorain Steel Co.
National Tube Co.
Thew Automatic Shovel Co.

Magnolia:

Magnolia Coal Co.

Mansfield:

North American Watch Co.
Ohio Brass Co.

Marblehead:

Kelley Island Lime & Transport Co.

Middletown:

American Rolling Mills Co.

Mount Vernon:

C. & G. Cooper Co.
Cleveland, Akron & Columbus Railway.

Norwood:

Allis-Chalmers Manufacturing Co.

Portsmouth:

The Drew-Selby Co.
Portsmouth Steel Co.

Springfield:

Robbins & Myers Co.

Steubenville:

La Belle Iron Works.

Tiffin:

U. S. Glass Co.

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OHIO—Concluded.

Toledo:

American Can Co.
Ann Arbor Railroad.
R. A. Bartley.
F. Bissell Co.
Boss Co.
Doehler Die Stamping Co.
S. M. Jones Co.
Libbey Glass Co.
Milbourn Wagon Co.
Willys-Overland Co.

Youngstown:

Carnegie Steel Co.
Republic Iron & Steel Co.¹
Republic Rubber Co.
William Todd Co.
Youngstown Sheet & Tube Co.

Zanesville:

American Encaustic Tiling Co. (Ltd.)
Roseville Potteries.
Weller Potteries.

OREGON.

Knappa:

Bay Creek Logging Co.

Portland:

Portland Eastern & Western Lumber Co.
Portland Railway Co.

Wauna:

Crossett Western Lumber Co.

PENNSYLVANIA.

Allentown:

Lehigh Valley Transit Co.

Ambler:

Asbestos Shingle, Slate & Sheathing Co.
Keasby & Matthison Co.

Ambridge:

American Bridge Co.

Beaver Brook:

A. S. Van Wickle Est.

Bethlehem:

Bethlehem Steel Co.

Birdsboro:

Birdsboro Steel Foundry & Machine Co.

Braddock:

Carnegie Steel Works.

Canonsburg:

East Palestine Pottery Co.

Chambersburg:

Chambersburg Engineering Co.
Cumberland Valley Railroad Co.

PENNSYLVANIA—Continued.

Coatesville:

Lukens Iron & Steel Co.
Worth Bros.

Cokeburg:

Lackawanna Steel Co.

Cornwall:

Cornwall Ore Bank Co.

Dunmore:

Hillside Coal & Iron Co.
Pennsylvania Coal Co.

Duquesne:

Carnegie Steel Co.

Easton:

Alpha Portland Cement Co.
Ingersoll-Sergeant Drill Co.
Thomas Iron Co.

Economy:

Central Tube Co.

Eddystone:

Baldwin Locomotive Works.

Ellsworth:

Ellsworth Collieries (Lackawanna Steel Co.).

Enola:

Dodson's Coal Co.

Erie:

General Electric Co.
Hammerhill Paper Co.
H. F. Watson Co.

Farrell:

American Sheet & Tin Plate Co.
American Steel & Wire Co.
Carnegie Steel Co.

Fredericktown:

Clyde Coal Co.

Greensburg:

Keystone Coal & Coke Co.

Harrisburg:

Central Iron & Steel Co.
Elliott-Fisher Co.
Lalanc & Grosjean Manufacturing Co.
Telegraph Printing Co.

Hazleton:

Duplan Silk Co.
A. S. Van Wickle Est.

Heilwood:

Penn-Mary Coal Co.

Hershey:

Hershey Chocolate Co.
Hershey Transit Co.

Hoguendagua:

Thomas Iron Co.

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PENNSYLVANIA—Continued.

Homestead:
 Carnegie Steel Co.
 Nesta Machine Co.
 Jersey Shore:
 New York Central Railroad.
 Johnstown:
 Cambria Steel Co.
 Lorain Steel Co.
 Kane:
 Lamont Chemical Co.
 Kingston:
 Kingston Coal Co.
 Lancaster:
 Hamilton Watch Co.
 Steinman Hardware Co.
 Lebanon:
 American Iron & Steel Manufacturing Co.
 Lebanon Valley Iron Co.
 Leisenring:
 H. C. Frick Coal & Coke Co.
 McKeesport:
 American Sheet Steel Co.
 American Sheet & Tin Plate Co.
 McKeesport Tin Plate Co.
 National Tube Co.
 Marcus Hook:
 American Viscose Co.
 Marianna:
 Pittsburg-Buffalo Coal Co.
 Union Coal & Coke Co.
 Meadow Lands:
 Meadow Lands Coal Co.
 Meadville:
 The Spirella Co.
 Midland:
 Midland Steel Co.
 Pittsburg Crucible Steel Co.
 Morea:
 Dodson Coal Co.
 Mount Carmel:
 Colonial Colliery Co.
 Mount Union:
 Mount Union Refractories Co.
 Natrona:
 Pennsylvania Salt Manufacturing Co.
 New Castle:
 American Sheet & Tin Plate Co.
 Carnegie Steel Co.
 Pittsburg Limestone Co.
 Nicetown:
 Midvale Steel Co.

PENNSYLVANIA—Continued.

Northampton:
 Atlas Portland Cement Co.
 Olyphant:
 Lackawanna Coal Co.
 Palmerton:
 New Jersey Zinc Co.
 Parkersburg:
 Parkersburg Iron Co.
 Pencoyd:
 American Bridge Company.
 Philadelphia:
 Alexander Bros.
 S. L. Allen Co.
 Alliance Coal Mining Co.
 Atlantic Refining Co.
 Baldwin Locomotive Works.
 Bell Telephone Co.
 J. G. Brill Co.
 John Bromley & Sons.
 Burk Bros.
 Burnham, Williams & Co.
 A. M. Collins Son & Co.
 Colonial Collieries Co.
 Wm. Cramp & Sons Ship & Engine Building Co.
 Curtis Publishing Co.
 Thomas Devlin Manufacturing Co.
 Henry Disston & Sons.
 Enterprise Manufacturing Co.
 Fels & Co.
 Firth & Foster Co.
 Robert H. Foerderer.
 General Asphalt Co.
 Gimbel Bros.
 Harrison Bros.
 Wm. H. Horstman Co.
 Ivins, Dietz & Metzger Co.
 Ketterlinus Lithographic Manufacturing Co.
 Keystone Watch Case Co.
 A. B. Kirschbaum Co.
 Lehigh Coal & Navigation Co.
 Lit Bros.
 Liveright Bros.
 Logan Iron & Steel Co.
 W. R. McTurk Coal Co.
 Maryd Coal Co.
 Wm. Mauer Co.
 Merritt & Co.
 Alfred F. Moore.
 Pennsylvania Railroad Co.
 Philadelphia Electric Co.

PENNSYLVANIA—Continued.

Philadelphia—Concluded.

Philadelphia Rapid Transit Co.
 Philadelphia & Reading Coal & Iron Co.
 Philadelphia & Reading Railroad Co.
 Powers-Weightman-Rosengarten Co.
 Public Ledger.
 C. Schmit & Sons Brewing Co.
 Smith, Kline & French Co.
 Standard Steel Works.
 John B. Stetson Co.
 Strawbridge & Clothier.
 Supplee-Biddle Hardware Co.
 Surpass Leather Co.
 United Gas Improvement Co.
 John Wanamaker (Inc.).
 Welsbach Co.
 C. H. Wheeler Co.
 Wm. Wood & Co.

Pittsburg:

American Bridge Co.
 American Locomotive Works.
 Armstrong Cork Co.
 Bessemer & Lake Erie Railroad Co.
 Blaine Coal Co.
 Cambria Steel Co.
 Carnegie Steel Co.
 Clyde Coal Co.
 Columbia Chemical Co.
 Connellsville Coke Co.
 Equitable Life Assurance Society.
 H. C. Frick Coke Co.
 Harbison-Walker Refractories Co.
 J. Horne & Co.
 H. J. Heinz.
 Jones & Laughlin Steel Co.
 Kaufmanns.
 The Manufacturers Light & Heat Co.
 McCreery & Co.
 Monongahela River Consolidated Coal & Coke Co.
 National Tube Co.
 Pittsburg Coal Co.
 Pittsburg & Conneaut Dock Co.
 Pittsburg & Lake Erie Railroad.
 Pittsburg Meter Co.
 Pittsburg Railway Co.
 Pittsburg Steel Foundry.
 Pittsburg Steamship Co.
 Pittsburg Valve Foundry and Construction Co.
 H. K. Porter.

PENNSYLVANIA—Concluded.

Pittsburg—Concluded.

W. J. Rainey Co.
 Rauh Bros. Clothing Factory.
 Reymer Candy Co.
 Shelby Steel Tube Co.
 Westinghouse Electric & Manufacturing Co.

Pottsville:

Eastern Steel Co.
 Maryd Coal Co.
 Philadelphia & Reading Coal & Iron Co.

Reading:

Reading Iron Co.
 Reading Steel Castings Co.
 C. K. Whitner & Co.

Scottdale:

H. C. Frick Coal & Coke Co.

Scranton:

Delaware & Hudson Co.
 International Text Book Co.
 Scranton Coal Co.
 Scranton Railway Co.
 St. Clair Coal Co.

Shamokin:

Mineral Railroad & Mining Co.
 Susquehanna Coal Co.

Siegfried:

Lawrence Portland Cement Co.

Steelton:

Bethlehem Steel Co.

Sunbury:

Susquehanna Silk Mills.

Swissvale:

Union Switch & Signal Co.

Vandergrift:

American Sheet & Tin Plate Co.
 Apollo Iron & Steel Co.
 United Engineering & Foundry Co.

Wilkes-Barre:

Lehigh & Wilkes-Barre Coal Co.
 Miner Hillard Milling Co.

Wilmerding:

Westinghouse Air Brake Co.

Woodlawn:

Jones & Laughlin Steel Co.

York:

General Roofing Manufacturing Co.
 Weaver Organ & Piano Co.

Northampton:

Atlas Portland Cement Co.

RHODE ISLAND.**Bristol:**

Cranston Worsted Mills.

Newport:

Newport Daily News.

Pawtucket:

Coats (J. & P., Ltd.).

Jenckes Spinning Co.

Lorraine Manufacturing Co.

Union Wadding Co.

Mapleville:

Coronet Worsted Co.

Peace Dale:

Peace Dale Manufacturing Co.

Providence:

Brown & Sharpe Manufacturing Co.

Collendar, McAuslan & Troup.

Eastern Coal Co.

General Fire Extinguisher Co.

Gorham Manufacturing Co.

Lonsdale Co.

Loutitt's Home Laundry.

O'Gorman Co.

Outlet Dry Goods Co.

Pocasset Worsted Co.

Providence Dyeing, Bleaching & Cal-
endering Co.

Providence Engineering Works.

Rhode Island Co.

Rumford Chemical Works.

Shepard Co.

United Traction & Electric Co.

Wanskuck Co.

SOUTH CAROLINA.**Abbeville:**

Abbeville Cotton Mills.

Aiken:

Aiken Manufacturing Co.

Anderson:

Gluck Mills.

Orr Cotton Mills.

Toxaway Mills.

Arlington:

Victor Manufacturing Co.

Belton:

Belton Mills.

Buffalo:

Union Buffalo Mills.

Cateechee:

Norris Cotton Mills.

Charleston:

Royal Bag & Yarn Co.

SOUTH CAROLINA—Continued.**Columbia:**

Capital City Mills.

Granby Cotton Mills.

Olympia Cotton Mills.

Palmetto Cotton Mills.

Richland Cotton Mills.

Darlington:

Darlington Manufacturing Co.

Enoree:

Enoree Manufacturing Co.

Fork Shoals:

Fork Shoals Cotton Mills.

Graniteville:

Graniteville Manufacturing Co.

Greenville:

American Spinning Co.

Brandon Mills.

Camperdown Mills.

Mills Manufacturing Co.

Monaghan Mills.

F. W. Poe Manufacturing Co.

Greenwood:

Grondel & Greenwood Cotton Mills.

Greers:

Victor Manufacturing Co.

Hartsville:

Hartsville Cotton Mill Co.

Honea Path:

Chiquola Cotton Mills.

Irene:

Saxe-Gotha Mills.

Lancaster:

Lancaster Cotton Mills.

Langley:

Langley Manufacturing Co.

Laurens:

Laurens Cotton Mills.

Watts Mills.

New Brookland:

Columbia Mills Co.

Ninety-six:

Ninety-six Mill.

Piedmont:

Piedmont Manufacturing Co.

Pelham:

Pelham Mills.

Pelzer:

Pelzer Manufacturing Co.

Ready River Factory:

Ready River Manufacturing Co.

SOUTH CAROLINA—Concluded.

Rock Hill:
 Arcade Cotton Mill.
 Hamilton Carhartt Co.
 Victoria Cotton Mills.
 Spartanburg:
 Arkwright Mills.
 Spartan Mills.
 Union:
 Excelsior Knitting Mills.
 Warrentonville:
 Warren Manufacturing Co.
 Williamston:
 Williamston Mills.
 Yorkville:
 Neely Manufacturing Co.
 York Cotton Mills.

TENNESSEE.

Chattanooga:
 Ross-Meehan Foundry Co.

TEXAS.

Dallas:
 Texas & Pacific Railway Co.
 El Paso:
 American Smelting & Refining Co.
 Houston:
 Galveston, Houston & Texas Railway.
 Houston & Texas Central Railroad Co.
 San Antonio:
 San Antonio & Aransas Pass Railway Co.
 Sherman:
 First National Bank.

VERMONT.

Brattleboro:
 Estey Organ Co.
 Proctor:
 Vermont Marble Co.
 St. Johnsbury:
 E. & T. Fairbanks & Co.

VIRGINIA.

Cape Charles:
 New York, Philadelphia & Norfolk Railroad Co.
 Danville:
 Dan River Power & Manufacturing Co.
 Lynchburg:
 Craddock-Terry Co.
 Lynchburg Cotton Mill.
 Lynchburg Traction & Light Co.
 United Cigarette Machine Co.

VIRGINIA—Concluded.

Norfolk:
 Seaboard Air Line Railway.
 Pulaski:
 General Chemical Co.
 Richmond:
 American Locomotive Co.
 Federal Cigar Co.
 Roanoke:
 Virginia Bridge & Iron Co.
 South Boston:
 Paramount Knitting Co.

WASHINGTON.

Bellingham:
 Bloedel-Donovan Lumber Mills.
 Seattle:
 Bon Marché Department Store.
 Northwest Trust & Safe Deposit Co.
 Pacific Coast Co.
 Seattle Electric Co.
 South Bellingham:
 Pacific American Fisheries.
 Puget Sound Mills & Amber Co.
 Tacoma:
 St. Paul & Tacoma Lumber Co.
 Wheeler Osgood Co.

WEST VIRGINIA.

Coalburg:
 Coalburg Kanawha Coal Co.
 Elkins:
 Coal & Coke Railway Co.
 Gary:
 U. S. Coal & Coke Co.
 Grant Town:
 Federal Coal & Coke Co.
 Handley:
 Chesapeake Mining Co.
 Hugheston:
 Hughes Creek Coal Co.
 West Virginia Gas & Coal Co.
 Longacre:
 Sunday Creek Coal Co.
 Mucklow:
 Paint Creek Collieries Co.
 Omar:
 Main Creek Coal Co.
 Piedmont:
 West Virginia Pulp & Paper Co.
 Slagle:
 McGregor Coal Co.
 Tams:
 Gulf Smokeless Coal Co.

WEST VIRGINIA—Concluded.

Vivian:

Bottom Creek Coal & Coke Co.
King Coal Co.

Wheeling:

Wheeling Potteries Co.
Wheeling Steel & Iron Co.
Whitaker-Glessner Co.

Winifrede:

Winifrede Coal Co.

WISCONSIN.

Beloit:

Fairbanks Morse Manufacturing Co.

Cudahy:

Federal Rubber Co.

Evansville:

Baker Manufacturing Co.

Horicon:

Van Brunt Manufacturing Co.

Horlicksville:

Horlick Malted Milk Co.

Kenosha:

Simonds Saw Works.

La Crosse:

La Crosse Plow Works.

Milwaukee:

Allis-Chalmers Co.
Boston Store.

WISCONSIN—Concluded.

Milwaukee—Concluded.

Hoffman & Billings Manufacturing Co.
International Harvester Co.
B. B. Johnson Soap Co.
F. W. Mayer Boot & Shoe Co.
Milwaukee Electric Railway & Light Co.

Milwaukee Gas Light Co.

Patton Paint Co.

Pfister-Vogel Co.

A. O. Smith Co.

Wisconsin Bridge & Iron Co.

Wisconsin Telephone Co.

Benjamin Young.

Neenah:

Kimberly-Clark Co.

Odanah:

J. S. Stearns Lumber Co.

Oshkosh:

Diamond Match Co.

Waite Grass Carpet Co.

Racine:

Belle City Malleable Iron Co.

J. I. Case Threshing Machine Co.

Hartmann Trunk Co.

Hilker-Wiechers Manufacturing Co.

Mitchell Motor Co.

SERIES OF BULLETINS PUBLISHED BY THE BUREAU OF LABOR STATISTICS.

The publication of the annual and special reports and of the bimonthly bulletin has been discontinued, and since July, 1912, a bulletin has been published at irregular intervals. Each number contains matter devoted to one of a series of general subjects. These bulletins are numbered consecutively in each series and also carry a consecutive whole number, beginning with No. 101. A list of the series, together with the individual bulletins falling under each, is given below. A list of the reports and bulletins of the bureau issued prior to July 1, 1912, will be furnished on application.

Wholesale Prices.

- No. 1. Wholesale prices, 1890 to 1912. (Bul. No. 114.)
- No. 2. Wholesale prices, 1890 to 1913. (Bul. No. 149.)
- No. 3. Index numbers of wholesale prices in the United States and foreign countries. (Bul. No. 173.)
- No. 4. Wholesale prices, 1890 to 1914. (Bul. No. 181.)
- No. 5. Wholesale prices, 1890 to 1915. (Bul. No. 200.)

Retail Prices and Cost of Living.

- No. 1. Retail prices, 1890 to 1911: Part I. (Bul. No. 105: Part I.)
Retail prices, 1890 to 1911: Part II—General tables. (Bul. No. 105: Part II.)
- No. 2. Retail prices, 1890 to June, 1912: Part I. (Bul. No. 106: Part I.)
Retail prices, 1890 to June, 1912: Part II—General tables. (Bul. No. 106: Part II.)
- No. 3. Retail prices, 1890 to August, 1912. (Bul. No. 108.)
- No. 4. Retail prices, 1890 to October, 1912. (Bul. No. 110.)
- No. 5. Retail prices, 1890 to December, 1912. (Bul. No. 113.)
- No. 6. Retail prices, 1890 to February, 1913. (Bul. No. 115.)
- No. 7. Sugar prices, from refiner to consumer. (Bul. No. 121.)
- No. 8. Retail prices, 1890 to April, 1913. (Bul. No. 125.)
- No. 9. Wheat and flour prices, from farmer to consumer. (Bul. No. 130.)
- No. 10. Retail prices, 1890 to June, 1913. (Bul. No. 132.)
- No. 11. Retail prices, 1890 to August, 1913. (Bul. No. 136.)
- No. 12. Retail prices, 1890 to October, 1913. (Bul. No. 138.)
- No. 13. Retail prices, 1890 to December, 1913. (Bul. No. 140.)
- No. 14. Retail prices, 1907 to December, 1914. (Bul. No. 156.)
- No. 15. Butter prices, from producer to consumer. (Bul. No. 164.)
- No. 16. Retail prices, 1907 to June, 1915. (Bul. No. 184.)
- No. 17. Retail prices, 1907 to December, 1915. (Bul. No. 197.)

Wages and Hours of Labor.

- No. 1. Wages and hours of labor in cotton, woolen, and silk industries, 1890 to 1912. (Bul. No. 128.)
- No. 2. Wages and hours of labor in lumber, millwork, and furniture industries, 1890 to 1912. (Bul. No. 129.)
- No. 3. Union scale of wages and hours of labor, 1907 to 1912. (Bul. No. 131.)
- No. 4. Wages and hours of labor in boot and shoe and hosiery and knit goods industries, 1890 to 1912. (Bul. No. 134.)
- No. 5. Wages and hours of labor in cigar and clothing industries, 1911 and 1912. (Bul. No. 135.)
- No. 6. Wages and hours of labor in building and repairing of steam railroad cars, 1890 to 1912. (Bul. No. 137.)
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- No. 8. Wages and regularity of employment in dress and waist industry, New York City. (Bul. No. 146.)
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- No. 10. Wages and hours of labor in cotton, woolen, and silk industries, 1907 to 1913. (Bul. No. 150.)
- No. 11. Wages and hours of labor in iron and steel industry in U. S., 1907 to 1912. (Bul. No. 151.)
- No. 12. Wages and hours of labor in lumber, millwork, and furniture industries, 1907 to 1913. (Bul. No. 153.)
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- No. 18. Wages and hours of labor in hosiery and underwear industry, 1907 to 1914. (Bul. No. 177.)
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- No. 20. Wages and hours of labor in the men's clothing industry, 1911 to 1914. (Bul. No. 187.)
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- No. 23. Street railway employment in the United States. (Bul. No. 204.) [In press.]

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- No. 5. The British System of Labor Exchanges. (Bul. No. 206.)

For material relating to these subjects, but not included in this series, see Miscellaneous series, Nos. 1, 10, 12 (Buls. Nos. 109, 172, 183).

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- No. 2. Working hours of women in the pea canneries of Wisconsin. (Bul. No. 119.)
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- No. 9. Dressmaking as a trade for women. (Bul. No. 193.)

For material relating to this subject, but not included in this series, see Miscellaneous series, Nos. 2, 3, 8 (Buls. Nos. 117, 118, 167).

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- No. 2. British National Insurance Act, 1911. (Bul. No. 102.)
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- No. 8. Compensation laws of the United States and foreign countries. (Bul. No. 203.) [In press.]
- No. 9. Proceedings of the Third Annual Meeting of the International Association of Industrial Accident Boards and Commissions. (Bul. No. 210.) [In press.]
- No. 10. Proceedings of the Conference on Social Insurance called by the International Association of Industrial Accident Boards and Commissions, December 5 to 9, 1916. Washington, D. C. (Bul. No. 212.) [In press.]

Industrial Accidents and Hygiene.

- No. 1. Lead poisoning in potteries, tile works, and porcelain enameled sanitary ware factories. (Bul. No. 104.)
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- No. 9. Labor laws and their administration in the Pacific States. (Bul. No. 211.) [In press.]
- No. 10. Labor legislation of 1916. (Bul. No. 213.) [In press.]

Foreign Labor Laws.

- No. 1. Administration of labor laws and factory inspection in European countries. (Bul. No. 142.)

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- No. 1. Vocational education survey of Minneapolis. (Bul. No. 199.) [In press.]

For material relating to this subject, but not included in this series, see Wages and hours of labor series, No. 9 (Bul. No. 147); Conciliation and arbitration series, No. 5 (Bul. 145); Miscellaneous series, Nos. 6, 7 (Buls. Nos. 159, 162).

Miscellaneous Series.

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